BUREAU OF HYGIENE AND TROPICAL DISEASES.

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HELMINTHIASIS.

BLACKIE (William K.). **A Helminthological Survey of Southern Rhodesia.**—No. 5 of the *Memoir Series of the London School of Hygiene & Tropical Medicine.* 1932. pp. vi+91. With 1 map and 3 figs. in text & 7 plates. [Numerous refs.] 1932. London: School of Hygiene & Tropical Medicine, Keppel Street, Gower Street, W.C.1. [10s. 6d. cloth; 8s. paper.]

This survey refers to human helminths only, except in so far as there was search in animals for worms already found in man. It extended from May, 1930, to February, 1931, and there comes to memory no similar work over a like period which has covered so wide a field with such completeness. And side by side with this must be put the fact that, accepting the conclusion (this *Bulletin*, Vol. 28, p. 227) that egg counts as a measure of the hookworm load of a community are a waste of time and money, Dr. Blackie has rejected their use and has so obtained leisure to concentrate on important matters; and by that very decision has reverted to an old and tried method of attack on helminthic infections. For faeces the usual microscopic technique was to examine the deposit obtained by the straining and centrifuging of a formalized saline suspension; and the macroscopic one straining of disintegrated stools on the lines advised by Maurice HALL. For urine, concentration was by precipitation, gravity precipitation followed by centrifugal. Blood examination took the usual lines.

These investigations indicated schistosomiasis as the most important helminthic infection in the area. With the exception of one district, *S. haematobium* and *S. mansoni* were both found in all parts examined, and the exceptional district was one which had to be traversed hurriedly and examined incompletely. Everywhere but in the Melsetter district *S. haematobium* greatly predominated with a relatively level general incidence, but in that district *S. mansoni* was slightly the more frequent. Gross clinical manifestations were very rare, and judged by egg numbers in 227 urines 130 infections were classed as very light, 50 as light and 47 as moderate. Yet 12 autopsies showed that clinical study gave an imperfect impression of the amount of tissue injury present; for although the parasites were few in numbers, the pathological changes were extensive and damaging, particularly in the liver in

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infections with *S. mansoni*. It was shown that the common local intermediate host of *S. haematobium* was *Physopsis globosa*, while that of *S. mansoni* was *Planorbis pfeifferi*. Although no natural infections were found in animals, *S. mansoni* was reared in *Cercopithecus pygerythrus* and infectivity continued for six months. Foci of *Pl. pfeifferi* were fewer and less widely spread than those of *Ph. globosa*. Alternate seasonal drying and scouring of river-beds serve to keep molluscan numbers in check. Details are given of the means by which infected snails were packed and transmitted to London, with a loss of only 10 per cent. in 26 days. A third schistosome parasitizes man here, *S. mattheei* [this *Bulletin*, Vol. 28, p. 195]. It was found in 11·3 per cent. of 167 sheep, in 30·8 per cent. of 26 cattle, and in 10 men. In 8 of these the diagnosis was made on the long spindle-shaped eggs (210 to 240 by 40 to 70μ) ; in two the adults were found in the veins after death, but since *S. haematobium* was also present the real pathogenicity could not be determined. The intermediate host was *Ph. globosa* ; the baboon, *Papio porcarius*, was implicated as a " reservoir " host, but in it the fluke inhabited the intestinal veins and not the vesical ones as it does in man. Two *C. pygerythrus* were artificially infected, and in them, too, the habitat was the intestinal veins. *S. mattheei* is not, then, a negligible parasite of man in this locality, and with development of stock farming is likely to become important. The difficulties of eradicating the molluscan hosts of schistosomes are pointed out ; and the importance of the early treatment of European school-children, with the diagnostic aid of Fairley's intradermal test, is stressed.

Hookworm infection stands next in importance, varying in the areas and communities sampled from 0 to 23·2 per cent. Since in the reviewer's egg-counting (a process essential for the evaluation of concentrative techniques although useless as an accurate gauge of worm load) the number of eggs delivered by the type of technique used in this investigation averaged 37 per cent. of those proved to be actually present, he is convinced that the real figures must have been considerably higher, and is confirmed in that conclusion by Dr. Blackie's comment that Dr. R. H. MORRIS used D.C.F. locally and demonstrated infection in 45 per cent. of 214 examinations, and in 81 per cent. of 92 specimens from alien natives. It seems little realized that any ordinary medical centrifuge can readily be adapted for D.C.F. As so determined, infection was markedly patchy, adjacent kraals showing relatively low or strikingly high figures, while some kraals showed none. So far as worm counts at autopsy or after treatment are a trustworthy guide, the worm load was under 25 in 30 out of the 33 cases examined. Two mines were investigated. In a shallow coalmine the percentages of infection detected in European officials and in native miners were 0 and 17, whereas in a deep gold mine they were 50 and 37, and there was evidence of lessening native infection with lengthened work in the mines. Although the mine gallery dead-ends, often used for defaecation, were deemed favourable in moisture content for larval development, no extractions of their soil were successful in displaying larvae. The predominant species of hookworm was *Necator americanus*, and this is correlated with SVENSSON's observation that eggs of this parasite develop at higher temperatures than do those of *A. duodenale*. [Against this correlation the reviewer ventures to point out what HUXLEY called " a nasty little fact." At an altitude of 5,000 to 7,000 feet in Darjeeling, where hookworm infection is a major problem, it is almost, apparently quite, purely with necator ; as one drops to lower and

warmer altitudes ancylostomes begin to appear ; moreover SVENSSON's cultures were untrapped.] With regard to possible ill effects caused by light infections, Blackie preserves an open mind, and in effect suggests that the matter still lacks adequate investigation.

A striking survey of infection by *Ternidens deminutus* was carried through without knowledge of that by SANDGROUND (*ante*, p. 69). In some 1,200 examinations carried out in the south-east corner of the Colony, this infection was found in 5·3 to 32 per cent. of persons, none being Europeans. Worm counts were made after 3 cc. of carbon tetrachloride, and it is necessary to note the fact, elsewhere reported (*loc. cit.* p. 314) that with this dose there occurred in his hands one of the usual freakish killings characteristic of the drug. The number of worms recovered in each case was 3 or 4, with a maximum of 8. Dark material, presumably blood, filled the worms' gut. Successful cultures yielded, about the seventh or eighth day, infective filariform larvae, with no tendency to climb from cultures ; they were activated by heat and by agitation, but were " negatively thermotropic and negatively phototropic " and failed to penetrate human skin. They had a limited resistance to drying. The worms were present naturally in 3 of 5 *C. pygerythrus* and 22 of 29 *P. porcarius*, but experimental oral infections all failed.

Eggs of *Strongyloides fülleborni* and larvae of *S. stercoralis* were found, the former naturally parasitizing the monkeys and baboons already mentioned. Ascaris was present in 0·7 to 12·1 per cent. of various communities, trichuris in 0·5 per cent. of 758 examinations. Trichinosis was not detected in pigs. In 200 blood examinations *F. bancrofti* was found twice and *F. perstans* 7 times. Eggs with the characters of *Physaloptera caucasica* were repeatedly found in one man ; they, too, were present in baboons and monkeys. Oesophagostomes and trichostrongylus eggs were each found once. *Taenia* and *Hymenolepis nana* infections reached a maximum local percentage of 6·3, and *H. diminuta* and *Dipylidium caninum* were found parasitizing the same girl. On four occasions eggs which had been ingested in food were detected in the faeces. Those of *Hepaticola hepatica* were found in a boy who had had a meal of field rats,* those of *Heterodera radicicola* were seen twice and were once traced to potatoes. Finally eggs of *S. mattheei* appeared in a man who had enjoyed on the previous day a satisfying length of half-raw ox gut.

Such are main features of a survey which takes by right an honourable place in the Memoirs Series of the London School of Hygiene and Tropical Medicine. *Clayton Lane.*

CABREZA (Juan) & TIRONA (Jose P.). **Incidence of Intestinal Parasitic Infection in 719 Filipino Beneficiaries.**—*Med. Bull. Veterans' Administration* formerly *U.S. Veterans' Bureau Med. Bull.* 1931. Nov. Vol. 7. No. 11. pp. 1060–1062.

These 719 men had enrolled for military service during the World War and had been discharged. 293 or 40·7 per cent. were found to the smear to carry intestinal parasites ; the numbers which harboured the different parasites (including, that is, multiple infections) were Ascaris 210, Trichuris 111, " Ankylostoma duodenale " 87, Strongyloides 12, *Taenia solium* 5, Enterobius 3 and *Dipylidium caninum* 1. *C. L.*

* A favourite food in parts of Central Africa.—Ed.

KHAW (O. K.). **A Survey of Peiping Latrines for Intestinal Parasites.**—*Nat. Med. Jl. China.* 1931. Aug.-Oct. Vol. 17. No. 4/5. pp. 622–643. With 6 figs (4 on 2 plates). [36 refs.]

Three samples of mixed faeces from each of 56 latrines were examined suspended in saline or stained with iodine-eosin. The percentages of latrines infected by the various parasites were cysts of *E. histolytica* 25, *E. coli* 82, *E. nana* 27, *I. bütschlii* 25, *Giardia intestinalis* 21, trichomonas trophozoits 12·5; ova of hookworms 32, ascaris 99, trichuris 16. Taenia onchospheres were found in one and nematode larvae in two latrines. The incidence was greater in public than in private latrines. The prevalence of "unconscious coprophagia" is noted. *C. L.*

VIALATTE (Ch.). Recherches helminthologiques dans la garnison de Fès. [**Helminths in the Fez Garrison.**]—*Arch. Inst. Pasteur d'Algérie.* 1931. Sept. Vol. 9. No. 3. pp. 470–475.

The method of faecal examination used is Telemann's on a single occasion. The findings are shown in the table.

Race.	No. of Individuals examined.	Number of positive examinations.					
		Ascaris.	*Necator americanus*	*Schistosoma Mansoni.*	*Strongyloides stercoralis* (larvae).	Taenias	Trichuris
Senegalese	143	3	104	6	2	10	31
Native North Africans	212	15	0	0	0	0	115
Europeans	146	0	0	0	0	1	32

It is believed that the hookworms are all necators partly because only these were found after an anthelmintic, partly because of the size of the eggs which average in this medium 70·6μ by 44μ. *C. L.*

PIROT (R.). Le parasitisme intestinal dans la région de Toulon. [**Intestinal Parasites at Toulon.**]—*Bull. Soc. Path. Exot.* 1932. Jan. 13. Vol. 25. No. 1. pp. 78–85.

In 500 examinations by the Telemann-Langeron technique made on all classes of persons (Europeans) the percentage infections were: Trichuris 13·6, Ascaris 2·8, Necator 0·4, *Taenia saginata* 0·6, *H. nana* 0·2, thread worms 0·2, *Entamoeba dysenteriae* (vegetative) 2·2, cysts 6·4, cysts of *E. dispar* 1·6, of *E. nana* 0·4, of *P. butschlii* 0·2, of *E. coli* 9·2, of *G. intestinalis* 3·8, *C. mesnili* (vegetative) 0·4, *T. intestinalis* 1·2, *Blastocystis hominis* 4·4, infusoria 0·2. *C. L.*

ZSCHUCKE (Johannes), SZIDAT (Lothar) & WIGAND (Rudolf). Ein Beitrag zur Kenntnis der Verbreitung menschlicher Helmintheninfektionen am Kurischen Haff. [**Distribution of Human Worm Infestations on the Kurisches Haff.**]—*Zent. f. Bakt.* I. Abt. Orig. 1932. Feb. 25. Vol. 124. No. 1/2. pp. 1–16. With 3 text figs. [30 refs.]

The authors have examined the faeces or 523 [or 535] persons on the west and east shores of the Kurisches Haff [a lagoon in East Prussia,

adjoining the Baltic] by Telemann's method and by a simple water-diluted smear. The infection percentages were, by ascaris 24, trichuris 53, and diphyllobothrium 34, while 29 showed no infection. In the village of Inse there was a 6·5 per cent. infection with *Opisthorchis felineus* in 213 examinations. Of double infections that with ascaris and trichuris was the commonest. Using Stoll's method of counting eggs it is computed that the average intensity of infection was by 12 ascaris, 6 trichuris, 3 to 4 diphyllobothrium and 5 opisthorchis. Ascaris and trichuris infections were commonest in children but did not spare an old lady of 100. The immediate surroundings of houses were much fouled by small children. The delicacy of uncooked fish is responsible for predominant adult infections with the broad tapeworm and opisthorchis, though a child of 15 months did not escape. Enterobius, it is noted, is doubtless widespread though not displayed by the techniques used. The ascaris and tapeworm infections produced definite subjective and objective damage, which included backwardness at school, and the region constitutes a focus of heavy infection which calls for disinfestation and change of habits of the community.

C. L.

JOYEUX (Ch.) & BAER (J. G.). Quelques faits relatifs à la pathogénie et à la thérapeutique des helminthiases. [**Pathogeny and Treatment of Helminthiasis.**]—*Marseille-Méd.* 1931. Oct. 25. Vol. 68. No. 30. pp. 493–500.

Certain general principles are re-stated. Damage done by worms is not proportional to the power of their organs of attachment. Those of any one species parasitize only certain allied host species. It is stated as a fact that SMILLIE and AUGUSTINE have shown in Alabama that infective hookworm larvae penetrate the skin of black races less readily than those of white. That parasitization by *T. saginata* is usually by one tapeworm is attributed to " prémunition " or resistance to further infection when infection has already occurred. *C. L.*

FÜLLEBORN (Friedrich). Wanderung der Nematodenlarven in Körper des Wirtes. [**Migrations of Nematode Larvae within Host.**]—Reprinted from *Die Naturwissenschaften.* 1931. Vol. 19. No. 4. pp. 79-82. [Refs. in footnotes.]

A fine summary of knowledge on the matter. One point in the life of a great helminthologist must again be brought out. LOOSS discovered the cutaneous route of hookworm infection that is now the basis of all hookworm campaigns ; through the millionaire Rockefeller Foundation those campaigns have brought relief to millions in the tropics ; yet LOOSS enjoyed none of this golden fruit but died in 1923, completely destitute from inflation of the mark. *C. L.*

HOEPPLI (R.) & HSÜ (H. F.). **Histological Changes in the Digestive Tract of Vertebrates due to Parasitic Worms.**—*Nat. Med. Jl. China.* 1931. Aug.-Oct. Vol. 17. No. 4/5. pp. 557–566. With 4 figs. on 2 plates.

Except for one, a crow, the tissue changes reported on were all produced by parasites in cold blooded animals. They comprise superficial lesions of the mucosa caused by suckers, rostellum and buccal

armature acting mechanically; changes such as dilatation mechanically produced in glands; and deep lesions such as nodules, and ulcer or tunnel formation. In some of the cases of superficial lesions there was marked congestion of the vessels about the place of attachment, attributed to dislocation and strangling of the tissues [but in view of WELLS's observations (*infra* p. 421) the injection of a vasodilator by worms must be considered]. *C. L.*

BRUMPT (E.). Présentation de préparations microscopiques. [**Demonstration of Microscopic Preparations.**]—*Bull. Soc. Path. Exot.* 1932. Feb. 10. Vol. 25. No. 2. pp. 98–100.

The great numbers of parasites here reported are noteworthy. In a mouse infected by skin with larvae of *Strongyloides ratti* the number of these estimated to be present in the hepatized lungs was 4,240, while only 100 were found in the intestine. It is suggested that the larvae reported by FROES in pleural fluid [this *Bulletin*, Vol. 27, p. 468] probably came there from the lung.

In a mouse it is estimated that more than 6,000 cysticercoids of *Hymenolepis nana fraterna* were present in the first two-thirds of the small intestine, while the simultaneous presence of many adults is against the oft-quoted opinion of GRASSI that one infection immunizes against subsequent ones. *C. L.*

CASTELLANI (Aldo). **Endemic Funiculitis. A Brief General Account.**—*Jl. Trop. Med. & Hyg.* 1931. Nov. 16. Vol. 34. No. 22. pp. 373–376. With 2 text figs. [19 refs.]

Castellani in answer to requests redescribes this condition. Essentially it is a streptococcal, grafted on a filarial or bilharzial infection, beginning suddenly with swelling and pain in the region of the cord and grave toxic symptoms. The pampiniform veins are dilated, thrombosed or full of pus. Operation (excision or perhaps free multiple incisions) must be undertaken within 4 days if septicaemia is to be avoided. *C. L.*

READ (Bernard E.). **Treatment of Worm Diseases with Chinese Drugs from the Pen Ts'ao Kang Mu with Notes.**—*Nat. Med. Jl. China.* 1931. Aug.-Oct. Vol. 17. No. 4/5. pp. 644–654.

CHU (H. J.) & CH'IANG (I. H.). **Extracts from Some Old Chinese Medical Books on Worm Infections.**—*Ibid.* pp. 655–666.

These old-time treatments are perhaps of much the same type the world over. Four drachms of refined lead, or a teaspoonful of the comb of hornet's nest reduced to ashes, are queer things; the juice of *Polygonum tinctorium* was advised for the "echo worm" which lives in the abdomen and answers back to the conversation; peach leaves were prescribed for the 3 insects living in head, abdomen and feet respectively which on a certain day during sleep have the underhand habit of reporting the individual's behaviour to heaven; infusion of the ash of one *old* wooden comb and one *old* bamboo toothcomb were held invaluable for symptoms caused by the greedy habit of chewing

lice. Then there is the long worm which comes out when food is smelt, the Ch'ih Ch'ung, which has a fleshy appearance and causes a murmuring in the intestine when it moves, another which reaches 40 to 50 feet in length. Piercing of the heart by a worm is fatal. [Still it is well to remember that Dr. John ARBUTHNOT, Queen Anne's famous physician, advised as "anthelmintick or contrary to worms" the swallowing of sharp fish bones with the intention of so annoying the worms that they forsook the intestine.] *C. L.*

LAMSON (P. D.), CALDWELL (E. L.), BROWN (H. W.) & WARD (C. B.). **A Comparison of the Anthelmintic Properties of Hexylresorcinol and Heptylresorcinol.**—*Amer. Jl. Hyg.* 1932. Jan. Vol. 15. No. 1. pp. 306–314. [13 refs.]

Hexylresorcinol has been given in "several hundred thousand human cases as a urinary antiseptic with no untoward results." At least 70 to 80 per cent. is excreted in the faeces, the corresponding figure for heptylresorcinol being at least 96 per cent. The latter is very insoluble, the former is soluble in approximately one part in 2,000 in "saline." Both combine with protein and may cause a certain amount of rapidly-passing superficial irritation in the stomach. In fasting patients the percentage reduction of hookworm eggs after treatment, presumably as counted by the Caldwells' method, was as follows when reduced to the formula of formed faeces.

		Egg Reduction Hexylresorcinol		
Dose.	No. of cases.	Minimum.	Average.	Maximum.
1·0 gm. ...	25	16·6	62·7	97·7
0·8 gm. ...	11	26·5	68·9	90·1
0·6 gm. ...	22	0·0	63·6	100·0
0·4 gm. ...	4	23·1	63·9	93·9

		Egg Reduction Heptylresorcinol.		
Dose.	No. of cases.	Minimum.	Average.	Maximum.
1·0 gm. ...	17	23·8	55·2	85·0
0·8 gm. ...	13	0·0	42·5	91·6
0·6 gm. ...	10	6·7	51·2	95·4
0·4 gm. ...	—	—	—	—

In ascariasis heptylresorcinol in doses of 1 gm. caused an average percentage egg reduction of 73·5 in 17 cases and in doses of 0·6 gm., of 88·3 in 26 cases, in each series the reduction varying from 0 to 100. For trichuris the average percentage reduction in 15 cases was 35·8 for 1 gm., with variations between a gain of 6·5 and a loss of 71·7, while in 24 cases given 0·6 gm. the average reduction was 11·5, and on the recounts one had the same number of eggs as before, 14 had fewer and 9 had more. *C. L.*

ANGLADE, GAUDIN (O.) & ARCONY. Sur quelques résultats cliniques de l'utilisation des pyréthrines dans le parasitisme intestinal et ses troubles secondaires. [**Clinical Results of Use of Pyrethrines in Intestinal Parasitism.**]—*Bull. Acad. Méd.* 1931. Dec. 15. 95th Year. 3rd Ser. Vol. 106. No. 40. pp. 654–657.

In the main the paper deals with oxyuris of which parasite it is confidently said that faeces never contain the eggs, and that all remedies employed for its eradication are either dangerous or ineffective. The treatment is a coffee spoonful of certain granules containing 2 per mille of pure pyrethrines, which granules X-rays show to disintegrate so slowly that the process occupies the entire passage of the intestine. [The obvious misstatements and lack of care which mark this enthusiastic advocacy (see too this *Bulletin, ante* p. 39) should not prevent a cold scientific testing of the drug if the formula of the granules is disclosed.] *C. L.*

GAUDIN (O.) & CARRON B.). Action des pyréthrines sur la musculature des helminthes. [**Action of Pyrethrines on Helminth Muscles.**]—*Bull. Acad. Méd.* 1931. Oct. 20. Year 95. 3rd Ser. Vol. 106. No. 32. pp. 226–229. With 2 text figs.

In *Ascaris lumbricoides* of the pig and in the pig tapeworm *Macracanthoryncus hirudinaceus* solution of pyrethrines paralyses the muscles, in the latter with a previous phase of stimulation. The strengths of solutions noted on two graphs are 1/5000 to 1/7,500. *C. L.*

LAMSON (Paul D.) & WARD (Charlotte B.). **Anthelmintic Properties of Certain Alkyl Cresols.**—*Proc. Soc. Experim. Biol. & Med.* 1931. Dec. Vol. 29. No. 3. pp. 340–341. [8 refs.] [Med. School, Vanderbilt Univ., Nashville, Tenn.]

" The introduction of the methyl group into phenol is well known to reduce its toxicity and it might be expected that these higher cresols would show a still less toxic action. Our experiments with 4-n-hexyl-m-cresol in rats and dogs confirm this view. . . . Because of certain properties of 4-n-hexyl-m-cresol, namely its being a liquid, and causing less local irritation than hexylresorcinol, further experiments in both animal and man are being carried out in order to determine its possible value as a human anthelmintic." *C. L.*

BAYLIS (H. A.). **The Names of Some Molluscan Hosts of the Schistosomes — Parasitic in Man.**—*Ann. Trop. Med. & Parasit.* 1931. Dec. 31. Vol. 25. Nos. 3 & 4. pp. 369–372.

" To sum up, while no attempt is made here to give a complete list of the vectors of the human Schistosomes, the following list of corrected names may serve to make clear the conclusions reached from the foregoing discussion.

Hosts of *Schistosoma haematobium*.

Bulinus truncatus (Audouin, 1826).
(Synonyms: *contortus, dybowskii, innesi*, etc.)
Physopsis africana Krauss, 1848.
Physopsis globosa (Morelet, 1866).
Planorbis (*Planorbis*) *dufourii* Graells, 1846.

Hosts of *S. mansoni*.

Planorbis (*Planorbula*) *boissyi* Potiez and Michaud, 1838.
Planorbis (*Planorbula*) *pfeifferi* Krauss, 1848.
Planorbis (*Planorbina*) *olivaceus* Spix, 1827.
Planorbis (*Planorbina*) *guadaloupensis* Sowerby, 1821.
Planorbis (*Planorbina*) *centimetralis* Lutz, 1918.
Planorbis (*Planorbina*) *antiguensis* Sowerby, in Reeve [1877 ?].
Physopsis africana Krauss, 1848.
Bulinus tropicus (Krauss, 1848).

Hosts of *S. japonicum.*
Oncomelania (*Hypsobia*) *nosophora* (Robson, 1915).
Oncomelania (*Hypsobia*) *formosana* (Pilsbry and Hirase, 1905).
Oncomelania (*Hemibia*) *hupensis* Gredler, 1881." *C. L.*

GORDON (R. M.). **The Molluscan Host of** *S. haematobium* **in Northern Nigeria.**—*Ann. Trop. Med. & Parasit.* 1932. Mar. 19. Vol. 26. No. 1. pp. 117–118. With 1 text fig.

Gordon demonstrated *Physopsis globosa* in numerous small ponds in Kano, Northern Nigeria. In them children bathe and fish, and a high proportion suffer from *S. haematobium* infection. BLACKLOCK (this *Bulletin*, Vol. 22, p. 463) showed that this snail acts as intermediate host to *S. haematobium* in Sierra Leone. *C. L.*

VOGEL (Hans). Beiträge zur Epidemiologie der Schistosomiasis in Liberia und Französisch-Guinea. [**Epidemiology of Schistosomiasis in Liberia and French Guinea.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1932. Mar. Vol. 36. No. 3. pp. 108–135. With 12 text figs. [2 pages of refs.]

In the interior of Liberia *S. haematobium* is widespread and the cause of much genito-urinary illness, but the local intermediate host has remained undetected in spite of field and experimental work. In view of BLACKLOCK's work in Sierra Leone *Physopsis globosa* may well be implicated here and in French Guinea. Regarding *S. mansoni*, *Planorbis pfeifferi* has a strong attraction for its miracidium, while cercariae from this snail have infected monkeys, which have passed lateral-spined eggs 40 days later, with recovery of adults from the veins. The cercariae of the three schistosomes common in man are held to have the same general structure, except that those of *S. mansoni* have 5 pairs of excretory cells, instead of 4, four pairs lying in the body and one in the tail. Since the intermediate hosts are held to be greatly restricted in numbers and distribution, the prospects of a campaign against them are good. *C. L.*

ZAVATTARI (Edoardo). Presenza della Schistosomiasi vescicale nel Fezzan. [**Urinary Schistosomiasis in Fezzan (Tripolitania).**]—Reprinted from *Boll. Soc. Med.-Chirurg. di Pavia.* 1932. Vol. 46. No. 1. 15 pp. [17 refs.]

The author in 1929 examined for schistosomiasis in Cyrenaica and found it endemic in the Derna district. He met with no intestinal cases; all were urinary. In the summer of 1931 he started a fresh investigation in Fezzan. Again he found *S. haematobium* only and examination for molluscs in several localities of Sciati, Hofra and Ghat resulted in the discovery of *Melania tuberculata* in abundance in most waters and *Bulinus contortus* less numerous and less frequently; no Planorbis. In spite of the presence of Melania he saw no cases of paragonimiasis. Recently Dr. RAGAZZI of Misurata informed the author that he had found *Planorbis metidjensis* which, however, is not, he states, an intermediate host of *S. mansoni*. He maintains that there is a chain of foci "from the Atlantic to the Nile across the whole of Northern Africa," and that there is need for a more complete survey to determine the distribution and prevalence of schistosomiasis in the colony. *H. H. S.*

MAKAR (Naguib). **Cystoscopic Appearances of Bilharziosis of the Bladder.**—*Jl. Egyptian Med. Assoc.* 1932. Feb. Vol. 15. No. 2. pp. 43–52. With 20 figs. (18 coloured) on 6 plates. [6 refs.]

This paper must be consulted in original. It is closely written and so cannot be satisfactorily abstracted, while the fine coloured plates of cystoscopic appearances are essential for its proper understanding. It deals with the cystoscopic appearances of bilharzial hyperaemia, tubercles and nodules; the end of these in calcification or a "membrane"; the separation of this with disclosure of ulceration; the bilharzial papilloma and carcinoma. An X-ray photo shows calcification of the wall of the bladder and ureter. *C. L.*

FAIRLEY (N. Hamilton). **Vesical Schistosomiasis complicated by Carcinoma.**—*Brit. Med. Jl.* 1931. Nov. 28. pp. 983–985. [3 refs.]

The duration of disease was about 30 years, the first symptoms appearing in South Africa. During the last 29 years he had not left England. The worms had, then, lived for that period and repeated reinfection had not preceded the superimposition of carcinoma on vesical schistosomiasis. At the first urine examination no ova were found, but the skin test and complement fixation with bilharzial antigen being markedly positive, subsequent examination was made and showed a few dead ova of *S. haematobium*. Death followed, with widely diffused carcinomatous nodules; the primary seat was at the base and neck of the bladder and contained many schistosome eggs, some with normal miracidia. It is pointed out how important is early diagnosis and treatment of schistosomiasis and how cystoscopy, complement fixation, and intradermal skin tests may reveal infection when ova cannot be found in urine or faeces. The nature of the case was not recognized till the patient came under the author's care. *C. L.*

GIRGES (Rameses). **The Prognosis of Schistosomiasis Haematobium.**—*Jl. Trop. Med. & Hyg.* 1931. Oct. 15. Vol. 34. No. 20. pp. 342–345.

Prognosis is considered in detail under the headings: general, presence of special symptoms, complicating conditions, and stage of the disease. *C. L.*

TOMB (J. Walker) & HELMY (M. M.). **The Diagnosis of Intestinal Schistosomiasis by Sedimentation.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Nov. 30. Vol. 25. No. 3. pp. 181–185.

Faeces are shaken up with 15 times their volume of 0·7 per cent. salt solution, the suspension sieved without stirring through gauze of 100 meshes to the linear inch, and allowed to stand in a urine glass from 15 to 20 minutes. For examination 0·5 cc. "of the contents of the urine glass" are examined covered by bits of ordinary slides. The smear method discovered 10 per cent. of 48,581 cases of *S. mansoni*, the sedimentation method 18 per cent. of 66,588 in the corresponding periods of consecutive years. By what is described as "the flotation method" ascaris infection was discovered in 42 per cent., and by this sedimentation method in 56 per cent. of 200 cases. [The floatation method selected must have been a poor one.] Heterophyes infection was discovered in 51 of 100 cases by smear and 72 of 100 by sedimentation. *C. L.*

KASTEIN (J.). Beobachtungen von gehäuftem Auftreten von "Schistosomum-japonicum"-Erkrankungen in Shanghai. [**A Crop of** *S. japonica* **Infections in Shanghai.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1932. Jan. Vol. 36. No. 1. pp. 1–4. With 1 text fig.

The recent Yangtse floods have induced a crop of acute schistosomiasis cases in and about Shanghai. They have followed the recognized course. Fuadin in doses rising to 5 cc. every other day has been successfully used in treatment. *C. L.*

MOHAMMED (Abdel Shafi). **The Secretory Glands of the Cercariae of** *S. haematobium* **and** *S. mansoni* **from Egypt.**—*Ann. Trop. Med. & Parasit.* 1932. Mar. 19. Vol. 26. No. 1. pp. 7–22. With 7 figs. [14 refs.]

Serial sections of many single cercariae have enabled the author to count in *S. haematobium* from *Bulinus contortus* and *B. dybowski* up to five pairs of glands, two large oxyphilic and three small basophilic and in *S. mansoni* from *Planorbis boissyi* six pairs, two large oxyphilic and four small basophilic. *C. L.*

AZMY (Soliman). **Pulmonary Arteriosclerosis of a Bilharzial Nature.**—*Jl. Egyptian Med. Assoc.* 1932. Mar. Vol. 15. No. 3. pp. 87–90.

In two Egyptian peasants heavily infected with urinary and intestinal bilharzia there were found advanced peribronchial and perivascular bilharziomata with ova in the adventitia of the vessels and a generalized pulmonary endarteritis obliterans. The pulmonary artery was dilated and studded with raised rubbery patches suggestive of early syphilitic lesions but containing no bilharzia ova. The left side of the heart was normal and the Wassermann reaction negative. *C. L.*

KHALIL & HASSAN (Ali). **The Serum Globulin in Human Schistosomiasis.**—*Bull. Soc. Path. Exot.* 1932. Feb. 10. Vol. 25. No. 2. pp. 149–166. [14 refs.]

"The aldehyde test is positive in a small percentage of cases of human schistosomiasis.

"The majority of the sera which gave positive tests were from cases with enlarged spleen.

"It appears that the degree of the disease or the viability of the worms, as judged by the presence of viable ova in the excreta, has no bearing on the test. The test cannot be relied on as a method of diagnosis of schistosomiasis.

"The sera which give a positive aldehyde test appear to be associated with a high globulin content, the ratio of globulin to albumin is high, and the euglobulin is also greatly increased.

"A systematic quantitative study of the serum proteins in schistosomiasis has been carried out for the first time.

"In human schistosomiasis, the total serum proteins do not vary much from normal, but the globulin and the globulin-albumin ratio and the percentage of the euglobulin are increased.

"In Bilharzia patients with enlarged spleen, the total globulins, the globulin-albumin ratio and the euglobulin are still further increased. This increase is not as great as in established cases of kala-azar.

"Most of the sera from patients with enlarged spleen showed a high percentage of euglobulin without any relation to the presence or absence of *Schistosoma* infection.

"In all the cases here cited, there is no evidence of the presence of visceral leishmaniasis which is totally absent from Egypt. In view of this, the aldehyde test cannot be considered diagnostic of visceral leishmaniasis." *C. L.*

BRUMPT (E.). *Cercaria ocellata* déterminant la dermatite des nageurs, provient d'une bilharzie des canards. [**Swimmer's Dermatitis caused by** *C. ocellata* **of Ducks.**]—*C. R. Acad. Sci.* 1931. Oct. 12. Vol. 193. No. 15. pp. 612–614. With 12 text figs.*

Being convinced from epidemiological studies in the Bois de Boulogne that the adult form of *Cercaria ocellata* must inhabit ducks or swans, Brumpt placed four ducks in a tub containing *Planorbis corneus*, *Limnaea stagnalis* and *L. limosa*. When killed on thirteenth day they showed eggs of *Bilharziella polonica*, others resembling those of *B. yokogawi*, and boat-shaped eggs. Eight controls were negative. Three ducks were then infected with *C. ocellata* and on death all showed the boat-shaped eggs in the mucosa of the alimentary canal; while, in two, very delicate paired flukes were found in the superficial vessels of that mucosa. The fragments so recovered and tissue sections enabled Brumpt to identify them as *Trichobilharzia kossarewi* Skrjabine and Zakharow, 1920, whose valid name accordingly becomes *Trichobilharzia ocellata* (La Valette, 1854) Brumpt, 1931.* *C. L.*

LIBERT (C. E. M. J.). **A Case of Paragonimiasis.**—*West African Med. Jl.* Lagos. 1932. Jan. Vol. 5. No. 3. pp. 51–52.

A boy of 11 had coughed blood at intervals for 5 years. This began when at Mamfe and his travels included Bamenda, Bale and Bafut (Cameroons, British Sphere), and his diet cray fish from the Badi river. On 5 successive days the sputum contained operculated ova "40–70μ in length" which had the appearance of those of paragonimus eggs. "A portion of the sputum has been forwarded to Professor LEIPER for his opinion as this is the first time a paragonimus infection has been reported in Nigeria. Treatment with emetine caused a clearing up of the symptoms and the boy now appears normal." *C. L.*

TOULLEC (F.) & RIOU (M.). Le tubage duodénal dans les distomatoses hépatiques à *Clonorchis sinensis*.—Essais thérapeutiques. [**Duodenal Tubage in** *C. sinensis* **Infections.**]—*Bull. Soc. Path. Exot.* 1932. Feb. 10. Vol. 25. No. 2. pp. 147–149.

Continuing their investigations [*ante*, p. 46] these authors have found that, judged by the eggs recovered by duodenal sound, treatments by filicine, benzol up to 120 drops, tartar emetic intravenously, oil of chenopodium 75 drops, thymol 3 gm., and phenolphthaleine tetriodide, were all useless. [One cc. of chenopodium oil furnished DARLING and SMILLIE (this *Bulletin*, Vol. 19, p. 247) with 18 to 70 drops of the oil according to the pipette used]. *C. L.*

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* This summary is in substitution for that published in this *Bulletin*, *ante*, p. 48.

MONTGOMERIE (R. F.). **On the Longevity of *Fasciola hepatica* in Experimentally Infected Rabbits.**—*Jl. Helminthology.* 1931. Nov. Vol. 9. No. 4. pp. 209–212.

As falling in with, and so confirming, work on hookworms, periodic counts of faeces of two rabbits which had carried an experimental infection with *F. hepatica* for over a year suggested no gradual dying off of the flukes. *C. L.*

KATSUTA (I.). **Studies on Trematodes whose Second Intermediate Hosts are Fishes from the Brackish Waters of Formosa (III. Report). On a New Trematode "Monorchotrema microrchia" of which the Mullet is the Second Intermediate Host.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1932. Feb. Vol. 31. No. 2 (322). [In Japanese. With 8 figs. English summary p. 16.]

"1. The encysted larvae are found in the scales, gills and fins of the mullet, but not in the muscles.

"2. The worm is very small, measuring 0·587 mm. in length by 0·233 mm. in breadth; the prepharynx is very short, the esophagus considerably longer, measuring 0·144 mm. in length.

"The ventral sucker is peculiar, as it is in *Monorchotrema taichui* and *Metagonimus yokogawai*, and is closely associated with the genital sucker; there are conspicuous radiating spines surrounding the ventral sucker, confined to the latter, wanting on the genital sucker; they number about 46–48, measuring 0·0096–0·0160 mm. in length by 0·0016–0·0032 mm. in breadth. The testis is single and smaller than in other species of Monorchotrema, measuring 0·091 mm. in length by 0·089 mm. in transverse diameter.

"3. The eggs of this worm resemble more or less closely those of *Metagonimus yokogawai* or Heterophyes, to which fact it will therefore be necessary to pay attention; their measurements are 0·0286 mm. in length and 0·0157 mm. in width; the posterior end forms a protuberance.

"4. Natural final hosts of this worm are dogs and cats; besides it can easily be established by experiment in man, but I did not succeed to infect the duck." *C. L.*

ESSEX (Hiram E.) & MAGATH (Thomas B.) **A Comparison of the Viability of Ova of the Broad Fish Tapeworm, *Diphyllobothrium latum*, from Man and Dogs: its Bearing on the Spread of Infestation with this Parasite.**—*Amer. Jl. Hyg.* 1931. Nov. Vol. 14. No. 3. pp. 698–704.

With regard to the statement that evidence in the press showed that ova from man developed readily while those from dog did not [*ante*, p. 49], the evidence is now offered. An ovum was held non-viable if it failed to produce a motile coracidium or showed degenerative changes. Ova were separated from faeces by repeated washing and sedimentation. 4,000 eggs were in this way isolated from three men and 5,000 from 5 dogs, the isolations being made in exactly similar conditions and the diets of the two classes being comparable. Viable coracidia resulted from 79·05 per cent. of the eggs from man and 0·96 per cent. of those from the dog. A temperature of -10°C. for 48 hours killed all eggs. "Cultures of ova held at a temperature of +15°C. [59°F.] for eight months developed normally when again placed at room temperature." Drying was fatal, but age and number of worms and diet of host had no influence. Most dogs expelled their worms in 6 to 8 months; one harboured his for two years. Lack of fertilization is held sufficient to account for the facts in this case. *C. L.*

PLOTZ (Milton). *Diphyllobothrium latum* **Infestation on the Eastern Seaboard : Twenty-One Cases from New York.**—*Jl. Amer. Med. Assoc.* 1932. Jan. 23. Vol. 98. No. 4. pp. 312–314.

" 1. Twenty-one cases of infestation with *Diphyllobothrium latum* are reported from New York City. These are the first cases reported in the literature from New York State and include five patients born in the United States, bringing the total number of reported native cases to thirty-one.

" 2. All but two of the patients were females and all but two Jewish.

" 3. Mild to severe anemia was found in all of fifteen cases in which blood studies were made. One is not justified in concluding from this series that there is a definite relationship between primary anemia and this disease. Eosinophilia was found in five of eleven cases in which differential counts were made." *C. L.*

MAPLESTONE (P. A.) & MUKERJI (A. K.). **Carbon Tetrachloride in the Treatment of Taenia Infections.**—*Indian Med. Gaz.* 1931. Dec. Vol. 66. No. 12. pp. 667–670.

The dose of carbon tetrachloride was 3 cc. The results are given in the Table :—

Results of treatment with male fern and carbon tetrachloride.

	Male fern.	Carbon tetra-chloride.
Number of cases	34	25
Number from which scolices were recovered	5	8
Number traced and found cured	0	10
Number not traced	21	3
Number not cured	8	4

" Our cure rate at its lowest estimate is 72 per cent. and that of Daubney and Carman varies between 69·5 per cent. and 97 per cent. for different series of cases, so there seems little doubt that carbon tetrachloride is a better drug than male fern for the removal of tapeworms. Another point is that as we have succeeded in curing at least the same percentage of cases with carbon tetrachloride by the mouth as Schneider has cured with male fern by the duodenal tube ; our form of treatment is preferable because it is much simpler and less irksome to the patient." [See this *Bulletin*, Vol. 27, p. 954.]

Tetrachlorethylene was tried on 3 cases of *T. saginata* infection without effect. *C. L.*

CARMAN (John A.). **A Note on the Clinical Aspect of the Treatment of Taeniasis with Carbon Tetrachloride.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Nov. 30. Vol. 25. No. 3. pp. 187–190.

The author's paper deals with between 2,500 and 3,000 doses in persons who eat meat inordinately and often raw ; he summarizes it as follows :—

" 1. Taeniasis is the cause of more morbidity than is usually admitted and cases of death from this cause are seen from time to time.

"2. A mixture of carbon tetrachloride and oil of chenopodium in the proportion of 3 to 1 is a safe and efficient anthelmintic against *T. saginata.*

"3. Certain simple precautions must be rigidly adhered to if the treatment is to be used in out-patient practice."

[The dosage used for an adult was 4 cc. of carbon tetrachloride and 1·3 cc. of oil of chenopodium of unstated ascaridole content. The minimum lethal dose of carbon tetrachloride is 1·5 cc. (See M. STRAUB, *Geneesk. Tijdschr. v. Nederl.-Indië*, 1925, Vol. 65, pp. 624–645, and this *Bulletin*, Vol. 23, p. 479.) He reported three deaths in men who had 1·5, 2 and 2 cc. respectively. The cases are detailed on pp. 633 to 637 and the dosage of all clearly stated in a table on p. 639.]

C. L.

SCHMELEWA (A. A.). Anwendung der Duodenalsonde bei Austreibung von Bandwürmern. [**Use of Duodenal Sound in Treatment for Tapeworm.**]—*Rev. Microbiol., Epidémiol. et Parasit.* 1931. Vol. 10. No. 3. pp. 297–303. [43 refs.] [In Russian. German summary p. 303.]

The drugs administered by the duodenal sound are stated as :—

Extr. filicis maris aether.	4 gm.
Inf. sennae compos.	30 gm.
Gum. Arabici	3 gm.
Quinine	0·5 gm.

and half to one later hour the same quantity of senna and 10 to 15 gm. of sulphate of magnesia or soda. The tapeworms were passed in 13 minutes to 2 hours ; in 18 of the 22 cases the heads were found ; the species were *D. latum* 2, *T. solium* 2, *T. saginata* 18. *C. L.*

MILLER (Harry M.), Jr. **Superinfection of Cats with** *Taenia taeniaeformis.*—*Jl. Preventive Med.* 1932. Jan. Vol. 6. No. 1. pp. 17–29. With 2 text figs.

—— & MASSIE (Edward). **Persistence of Acquired Immunity to** *Cysticercus fasciolaris* **after Removal of the Worms.**—*Ibid.* pp. 31–36.

——. **Further Studies on Immunity to a Metazoan Parasite,** *Cysticercus fasciolaris.*—*Ibid.* pp. 37–46.

So far as the adult stage goes, the presence of the strobile in cats does not prevent their obtaining an added infection [it is in this sense that superinfection is here used] of this parasite when fed with the cysticercus. But pedigreed white rats do obtain an immunity to further infection with the cysticercus even when the original cysticerci are removed, after laparotomy and appropriate incision of the liver, an immunity lasting for at least 60 days. Moreover, immunity to the development of onchospheres into cysticerci can be produced by intraperitoneal injection of fresh strobile into the rat or of powdered lipoid-free extract of the dried strobile, or of living cysticerci ; but powdered *T. pisiformis* was inactive nor did powdered *T. taeniaeformis*, injected after rats had been infected with onchospheres, inhibit cyst development. [It is believed that the above expresses the intention of the author's summary.] *C. L.*

BAYLIS (H. A.). **On a *Coenurus* from Man.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1932. Jan. 30. Vol. 25. No. 4. pp. 275–280. With 3 text figs.

Baylis has examined part of a coenurus removed from man [*ante*, p. 54]. He deals with number, size and shape of hooks. In form the larger hooks seem to be closer to those of *T. multiceps*, the smaller to those of *T. serialis*. He finds, however, greater variation of shape in hooks of the same species but of different degree of development than between hooks of different species, and questions whether these two species can be separated at all by larval morphology; and he refuses to burden literature with a new name which may be merely a synonym.

C. L.

MORQUIO (L.). L'hémiplégie du kyste hydatique cérébral chez l'enfant. [**Hemiplegia from Cerebral Hydatid Cyst.**]—*Rev. Sud-Américaine de Méd. et de Chirurg.* Paris. 1932. Jan. Vol. 3. No. 1. pp. 39–58. With 8 text figs.

Five cases of cerebral hydatid are described with radiograms showing opening of the cranial sutures; in one case there was also a cyst in each lung. Four of the cases were operated on with two cures and two deaths.

C. L.

CORT (W. W.) & STOLL (N. R.). **Studies on *Ascaris lumbricoides* and *Trichuris trichiura* in China.**—*Amer. Jl. Hyg.* 1931. Nov. Vol. 14. No. 3. pp. 655–689. With 1 graph. [41 refs.]

In 5 Chinese districts about 4,000 faecal examinations were made by a Stoll egg counting method for ascaris and trichuris infections. The average infection by ascaris was so great in adults in some groups that it is concluded that these must be as susceptible as are children. In most groups the heavy soil pollution near houses must be a factor in causing a general incidence of over 80 per cent. The highest infections with both parasites were found in the Canton delta which produced what is claimed as a record, 1,001,200 ascaris eggs per gram of faeces. "Unfortunately we do not have information from Kwang Yik Wai which makes it possible to suggest what combination of conditions was present to build up such an infestation." Again, "In this region the trichuris infestation was especially heavy as compared with the other groups, which emphasizes the especial need of an abundance of moisture for the building up of heavy infestations with this parasite. On the other hand there was a very high incidence of trichuris in the group from northern Shantung with a low rainfall and a long cold winter."

"It was of interest to find one group in the Yangtze delta with a comparatively low infestation with both parasites associated with a good economic status and habits of cleanliness much better than the average for rural China. This shows that human infection with these parasites can be much restricted even where their eggs are spread widely by the use of human feces as fertiliser. On the whole this study emphasizes the fact that the combination of soil pollution by young children with the use of human excrement as fertilizer produces conditions very favourable for the spread of ascaris and trichuris especially in the adults. Unexplained differences in the intensity and distribution of these two parasites in the same population groups suggest differences in their etiology beyond those already understood."

C. L.

KELLER (A. E.). *Ascaris lumbricoides*: **Loss of Infestation without Treatment.**—*Jl. Amer. Med. Assoc.* 1931. Oct. 31. Vol. 97. No. 18. pp. 1299–1300.

The author's conclusions, based on egg counts, are :—

"The results obtained from this study show that under environmental conditions which are not suitable for the transmission of intestinal parasites the worm burden of infested individuals is markedly reduced without the use of anthelmintics. In this group of patients who did not receive treatment over a period of fifteen months a reduction in incidence of 100 per cent. occurred in the cases of Ascaris, 83·4 per cent. in the cases of Hymenolepis nana, 75·6 per cent. in the cases of Trichuris and 59 per cent. in the cases of hookworm infestation. This study shows that proper methods of disposal of human feces are more effective in the control of the common human intestinal parasites than the use of anthelmintics alone."

C. L.

MORTON (Charles Bruce) & ARCHER (Vincent W.). **Ascariasis: Some Surgical and Roentgenologic Aspects.**—*Jl. Amer. Med. Assoc.* 1932. Feb. 6. Vol. 98. No. 6. pp. 473–475.

"The histories of 110 patients with ascariasis were studied [in the University of Virginia Hospital] and in 41 individuals surgical consideration had been warranted. In five of them symptoms of cholecystitis had been simulated, and in twenty-four appendicitis or intestinal obstruction had been suspected. Eight patients had undergone operation, and in all instances ascarids were apparently responsible for the symptoms.

"It was suggested that ascariasis be considered in the differential diagnosis of atypical abdominal symptoms. A simple technic for the roentgenologic depiction of ascarids in the gastro-intestinal tract was described briefly. It was recommended for use in addition to the usual examination of the stools."

It consists in a barium meal after a night's fast with X-ray exposures 1, 2 and 4 hours later [this *Bulletin*, Vol. 28, p. 688.] *C. L.*

MAPLESTONE (P. A.) & MUKERJI (A. K.). **The Treatment of Ascariasis.** —*Indian Med. Gaz.* 1931. Nov. Vol. 66. No. 11. pp. 627–629.

Using for the adult Indian santonin, calomel and sodium bicarbonate in doses of 5 grains [0·3 gm.] each, CHOPRA and CHANDLER (this *Bulletin*, Vol. 22, p. 672) claimed cures in 92 per cent. of 25 cases examined ten days later by the Kofoid and Barber technique. Maplestone and Mukerji using precisely the same treatment but checking it by D.C.F. obtained cures in 42·85 per cent. of 28 outpatients and 4 of 9 inpatients. With Russian santonin the corresponding cures were 20·5 per cent. of 44 and 6 of 9. With oil of chenopodium of unstated ascaridole content in 3 doses of 10 minims (0·6 cc.) each at hourly intervals, with magnesium sulphate two hours after the last, there were cures to D.C.F. of 56·5 per cent. of 23 outpatients and 54·5 per cent. of 44 inpatients. With 0·3 gm. of santonin in powder and 1 cc. of oil of chenopodium in capsule swallowed together followed by the saline, 23 outpatients had 56·5 per cent. of cures and 34 inpatients 82·3. The inpatients had a light diet the day before; there is no saying whether outpatients obeyed instructions as to diet. Age probably had an effect in modifying efficiency since, massing all treatment together, there were cures in 60 per cent. of adults and 48·2 per cent. of children, the figures for the combined chenopodium and santonin treatments being 92·3 and 54·8 respectively.

C. L.

v. UNRUH (V.). Askariasis im subtropischen Mexiko. [**Ascariasis in Subtropical Mexico.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1932. Jan. Vol. 36. No. 1. pp. 4–9.

The treatment was by capsules each containing 0·3 gm. of ascaridole. A hundred cases are reported. Illustrative cases show that the dose at 2½ and 4½ years was 1 capsule, at 11 years 2 capsules, at 16 and 19 years three capsules. The dose then for an adult was 0·9 gm. or as is alternatively stated 30 drops, and this is described as completely non-toxic. [It is a misfortune that drops should still be mentioned as a measurement. DARLING and SMILLIE pointed out in 1921 that various pipettes delivered from 18 to 70 drops of the whole oil for 1 cc.] *C. L.*

STILES (Charles Wardell). **Hookworm Disease in Certain Parts of the South : a New Plan of Attack.**—*Southern Med. Jl.* 1932. Feb. Vol. 25. No. 2. pp. 189–192.

Having been retired for physical disability after 40 years service, Stiles has reverted to a favourite subject—hookworm disease, and reports his experience of a 6,700 mile tour through the Southern States with which he has kept in touch since 1901. In that period the advance in public health has been enormous, with accompanying widespread belief that hookworm disease in man has almost disappeared. With this Stiles is in disagreement, and by way of demonstration cites two schools in which the results of a quick symptomatic inspection were compared with those of microscopic examination by unstated and possibly by varying techniques :—

	Percentage infected as judged by		
	Symptomatic estimate.		Microscopic Examination.
	Uncorrected.	Corrected.	
School 14	96	77	97
School 15a	99	79	90

He emphasized the role of hookworm infection in producing backwardness in children and gives, among others equally striking, this example :—

"In a certain school (No. 71 of our series), after I had indicated the hookworm cases in five of the rooms, the principal exclaimed :

"'Doctor, those children whom you have selected are our mentally backward children ! If hookworms cause backwardness, I want you to put the view to a test in connection with the sections of the eighth grade.'

"I did so, with the result that in the highest section (described by the principal as her 'prize' room) approximately 11 per cent. was selected as hookworm cases and suspects ; in the next section approximately 38 per cent., and in the lowest section 75 per cent."

The new plan of control advised is that teachers should select all children who are mentally backward or in poor physical condition, all girls maturing slowly or with irregular menses, and all children who have had ground itch within a year ; should send their faeces for microscopic examination ; and should report positives to the parents and advise that the children should be treated. While no treatment is

advocated without a positive microscopic examination, it is suggested that this procedure will expose the mass of hookworm cases. Stiles ends :

" The fundamental problem in hookworm control is not a question of bookkeeping or microscopic examinations, but requires a change in the daily habits of hundreds of thousands of rural whites, Indians, and negroes. The solution of this problem will take at least three generations more of combined educational effort on the part of the schools, the health officers, and the physicians." *C. L.*

SCHAPIRO (Louis) & NAUCK (Ernst G.). **Observations on Hookworm Disease in Costa Rica based on Postmortem Findings.**—*Amer. Jl. Hyg.* 1931. Nov. Vol. 14. No. 3. pp. 705–714.

An important paper in view of the teaching in certain quarters that the gravity of hookworm infections can be indicated by the load of worms carried at a particular time. The report is based on 400 post-mortem examinations on hospital patients, all made within 24 hours of death. Hookworms were found in 133 cadavera and 24 persons died of hookworm disease, that is 18 per cent. of infected persons. In 79 of these infected persons data sufficient for the authors' purpose were collected. They yielded a total of 7,693 hookworms or an average load of 97·3, the care taken to insure complete collection being great ; in the 24 cases which died from infection the average worm load was 257, in the 55 who died from other causes it was 26. The percentage of hookworm species recovered from these 79 cases was necator 16·4, ancylostomes 15·2, both 68·4, the total numbers being *A. duodenale* 3,638 and *N. americanus* 4,055. Ovum counts from the bowel contents compared with worm counts gave more than twice the number of eggs expected by the Stoll factors, while the first two figures in a table of 10 examinations showed actual counts of 197,000 and 3,000 eggs against 76,400 and 17,350 had the postulated worm-egg ratios held. It is not known whether or not these people had been treated, though " it is to be inferred that a great many of them received hookworm treatment while in the hospital "; but

" In all cases in which more than 500 to 600 parasites were found at autopsy, symptoms of severe anemia with characteristic circulatory disturbances were present, especially the very typical edema of the skin and of almost all the body tissues. These cases also showed transudation into the serous cavities (which only rarely led to the accumulation of very large amounts of fluid); fatty degeneration of the heart musculature and of the liver and kidneys was frequently extensive. Pigment storage, especially the accumulation of iron-containing pigment in the liver, which is regarded by some authors as evidence of the destruction of the blood induced by toxins, was, on the other hand, almost entirely lacking. The spleen was unaltered in uncomplicated cases; occasionally it was small, with simultaneous atrophy of the Malpighian bodies and decrease of lymphatic tissue. Swelling of the lymph glands, in particular those of the retroperitoneum could be determined in a certain percentage of the cases. In the cases of marked anemia, the bone marrow always showed changes, indicating regenerative processes."

" The mucus found on the surface of the mucosa (which is frequently very sticky and abundant) may be very markedly stained with blood."

C. L.

VAN SLYPE (W.). Sur la fréquence de l'ankylostomiase. Considérations thérapeutiques. [**Ankylostomiasis and its Treatment.**]—*Bull. Méd. du Katanga.* 1931. Vol. 8. No. 5. pp. 143–146.

By an unstated floatation method—and they vary markedly in accuracy—72 routine examinations were made in a hospital. Hookworm eggs were found twenty-four times, taenia and schistosome eggs each twice, and strongyloides, ascaris, trichuris, giardia, trichomonas, and *Entamoeba histolytica* each once. Eleven of the hookworm cases were treated, normally with thymol 4 gm. (60 grs.) packed in capsules, with pretreatment and posttreatment purges. One died; an old rather undernourished man with chronic bronchitis given after hesitation 3 gm; four hours after taking the posttreatment purge of sulphate of magnesia, he developed pulmonary congestion with intense dyspnoea, blood-stained frothy expectoration and dullness over the right lung and died rapidly. It is noted that the symptoms are unique. Following treatment in the other cases, after a preliminary increase in egg numbers, these disappeared, sometimes to return, there being however no suggestion in the paper that this is a condition whose occurrence was established many years since. Ten persons were treated with 3 cc. of pure carbon tetrachloride without ill effect and with cure. Van Slype says that the thymol death was perhaps a coincidence. [Of the few reported deaths after thymol in the three million odd administrations, only two have had the same symptoms—two brothers who died collapsed and comatose with bloodstained vomit. In the attribution of symptoms to a single cause it is usual in medicine to expect that they shall have at least some slight measure of agreement.] *C. L.*

HUSSAMEDDIN. Sur l'ankylostomiase répandue dans le département de Rizé en Turquie et sur la lutte entreprise contre cette maladie. [**Ankylostomiasis in Department of Rizé, Turkey.**]—*Bull. Office Internat. d'Hyg. Publique.* 1931. Oct. Vol. 23. No. 10. pp. 1824–1828.

Investigations in Turkish laboratories have indicated Rizé at the south-east angle of the Black Sea as the spot in Turkey most heavily infected with hookworms. The coastal valleys are very fertile, growing crops and vines, and have a large rainfall. An inquiry by ZIYA Bey consisted in microscopic examination of stools of 5,989 persons, evidently by smear since it is stated that 3 or 4 examinations are necessary before infection can be determined. This being impracticable and concentrative methods evidently not considered, the routine was to administer an anthelmintic to all persons when the infection rate of a village approached 50 per cent. The average, as so determined, was 51·6 per cent., with variations from 41 to 75, but with no difference produced by age or sex. *Necator americanus* was the only hookworm found. Anthelmintic treatment was given to 5,001 persons. A single treatment, seemingly irrespective of kind or dose, reduced observed infection to 8·6 per cent. and a second to 1 per cent. At first this consisted of oil of chenopodium and carbon tetrachloride in unstated dosage, but owing to observed toxicity the former was omitted. Carbon tetrachloride (great stress is laid on the need for purity) in single adult dosage of 2 cc. gave to 20 per cent. of 1,200 persons violent headache and collapse, symptoms lasting for 6 to 12 or even 48 hours, while a rather high percentage suffered from vertigo and dizziness without headache. A child

of 8 (who according to the dosage for age given in the paper must have received between 0·8 and 1·6 cc.) was seized with very violent abdominal pain and vomiting next day, and died 3 days later; it is unstated, presumably it is unknown, whether or not she had ascaris infection. To 500 persons the drug was given in two doses followed in two hours by sulphate of magnesia; 5 per cent. had marked headache and faintness, another 5 per cent. had the same symptoms with a rise in temperature to 37·5°C. Accordingly the dose was reduced to 1·5 cc. in two portions with slight vertigo in 2 to 3 per cent. of cases. The local appearance of symptoms of hookworm infection dates only from the war and it is believed that the place became infected during the Russian invasion. Latrines are defective and insufficient. Some new ones have been constructed and advice has been given as to sanitation.

C. L.

WELLS (Herbert S.). **Observations on the Blood Sucking Activities of the Hookworm,** *Ancylostoma caninum.—Jl. Parasitology.* 1931. June. Vol. 17. No. 4. pp. 167–182. With 1 text fig.

After noting the controversy as to whether hookworms are blood-suckers, Wells shows by direct observation that *Ancylostoma caninum* is. By an ingenious clamp, an opened loop of dog's intestine was so arranged outside the body that hookworms engaged on their normal avocations could be observed directly by a low-power microscope while bathed in normal saline. Worms placed on the intestinal mucosa may move about for hours without attaching themselves, or through the purchase of their tails may push their heads down between the villi and have evidently considerable work to do before getting a firm attachment near the bases of these. Should they become attached near the tip of a villus they are restless till they get a deeper hold, but in the meantime the observer has a clear view of the process and effects of feeding. The vessels of the villus itself fill with blood, which in view of the site of attachment can hardly be due to strangulation. A red disc appears on that part of its surface which is enclosed in the oral aperture. The oral cavity fills with blood. The effect is produced by oesophageal suction, its lumen is widened, evidently by contraction of its roughly radial muscles, while ordinarily the closure of the oesophageo-intestinal valves enables the vacuum to be held and fills the lumen at first with plasma and cells and later with blood. With relaxation of the oesophagus the lumen first closes beside the oral capsule while the narrowing of the rest forces the contained blood into the intestine. When this fills, the forcible contraction [presumably of muscles which Looss showed to lie at posterior end] forces a sudden droplet of blood through the anus, and this occurs from the male even when it is in copula. Oesophageal contractions have not uncommonly a rhythm of 120 to 250 per minute. By enclosing the posterior end of a female worm in a pipette containing normal saline, by counting the red corpuscles passed in a given time, and by comparing these numbers with those in the dog's blood, it is calculated that each worm robs the host of 0·84 cc. of blood daily. This passes slowly along the gut, its haemoglobin becomes reduced as it nears the anus; so that hookworms can obtain oxygen through the intestinal lining. When a worm is placed in red blood, the haemoglobin near it gradually becomes reduced, presumably by absorption of oxygen through the cuticle. A copious supply of blood is

necessary for active vital processes. A worm detached for some hours is very sluggish, but if strong enough to reattach and obtain some blood, rapidly became fully vigorous; oviposition usually ceased on detachment of a worm, but was resumed in the one instance followed up as soon as feeding was effectively resumed.

Wells hesitates to conclude that this loss of blood is the cause of anaemia by reason of "the almost unanimous opinion of those who have done the most work with such patients that, since the stools of persons suffering from hookworm disease even in its most severe form are not highly coloured they cannot contain much blood," but he notes that since there is no method by which the amount of faecal blood can be estimated this appears to be assumption only. [Its presence in the faeces in ankylostome infection even with less than 20 worms was reported by Duncan WHYTE, this *Bulletin*, Vol. 8, p. 196.] *C. L.*

CALDWELL (Fred C.) & CALDWELL (Elfreda L.). **The Rate of Loss of Hookworms in the Absence of Reinfestation.**—*Jl. Parasitology.* 1931. June. Vol. 17. No. 4. pp. 209–222. With 1 text fig.

Three groups were studied. First one of Cherokee Indian scholars at a boarding school whose hygienic state was such as to make unreasonable any suggestion of infection during term, though the boys were not above playing pranks with the specimens they submitted. Second a rural community on a sandy Alabama soil. Third an individual, an accidental laboratory infection studied at intervals during 4 years in conditions making further infection unreasonable. Those found positive to "the salt flotation method" had mixtures of the stools passed on 3 consecutive days egg-counted by the Caldwells' own method at about monthly intervals. The average counts of the Indian group were unvarying from September to May; those of the Alabama group were the same in April as they had been in the previous October-November, with however an intermediate rise; those of the individual showed no notable variation in 4 years. Regarding age influence, in children in the rural group who were under 8, the average counts increased during the period of observation while in those over 13 they decreased. [See also CHANDLER, this *Bulletin*, Vol. 23, p. 773; Vol. 26, p. 991; CORT, Vol. 27, p. 440; PAYNE & PAYNE, Vol. 29, p. 64.]

C. L.

VAN THIEL (P. H.) & WOLFF (A. E.). **A Comparison of the Chemical Methods used to separate Larvae of the Hookworm of Man and Animals from the Larvae of Free Living Nematodes.**—*Amer. Jl. Hyg.* 1931. Nov. Vol. 14. No. 3. pp. 726–732.

For distinguishing infective hookworm larvae from those of free-living nematodes, the authors compare the effects on them of BAERMANN's method, which adds one part of 7·5 per cent. caustic potash to five of water, with that of CORT, which adds one part of trade formaldehyde (40 per cent.) to 5 to 25 parts of water. If the worker can stand the formalin, that is advised for use, but it is significantly added, "We cannot dispense with the morphological examination of the larvae when using either of these methods," which aim at killing free-living nematodes while sheathed infective hookworm larvae escape. *C. L.*

LANE (Clayton). **Extra-Corporeal Development of Hookworms.**—*Lancet.* 1932. Apr. 2. pp. 741–745. With 2 text figs. [11 refs.]

"Investigation of 547 earth cultures has shown emphatically that emigration of infective hookworm larvae from them is frequent and may be very great, and accordingly that the many conclusions regarding larval biology, including longevity, conclusions which are mainly based on untrapped cultures, rest on so precarious a basis that they certainly are far from exact; that properly constituted larval traps have a high efficiency, and that any failure presumably lies in the make-up of the individual trap; that there is a method of extracting larvae, economical of space and allowing of this being done under exact conditions of temperature, which is not less efficient than that in general use; that to submit material to larval extraction for a few hours does not accurately measure its possible, perhaps not its momentary, infectivity; that the effects of texture of subsoil on the local prevalence of hookworm infection is reasonably explicable if hookworm larvae migrate through soil and subsoil in all directions, and are without that negative geotaxis which is commonly postulated—it is believed incorrectly, and certainly not merely without adequate evidence, but against some that exists; that if it is as safe as it seems to generalise on over 50 cultures of a mixture of four parts of earth and one of faeces, conducted with close checking of the water content, larvae develop best when this is as low as 25 per cent.; that even when in these conditions it falls as low as 9 per cent., and the culture is powdery, more than half the eggs may have developed into infective larvae, and that these may be so vigorous as to constitute of such infected soil a spot of intense infectivity; that these dry conditions need not lessen the infectivity of an infected spot, though they may annul migration of larvae from it; and that since infection in backward races is mainly dejectional, obtained during defaecation, drought need in no way lessen the infectivity of those spots which are favoured by and returned to by such people day after day for this purpose, especially if they wash the parts on the spot. There is then no present justification for assuming that in certain regions and at certain seasons the possibility of acquiring infection must be disregarded. It is wiser to find out and not to guess." *C. L.*

EARLE (Walter C.) & DOERING (Carl R.). **An Evaluation of Egg-Count Data in Hookworm Infestation.**—*Amer. Jl. Hyg.* 1932. Mar. Vol. 15. No. 2. pp. 513–556. With 6 text figs. [22 refs.]

"1. The frequency distribution of worm and egg counts is such that the logarithms of these counts more nearly approach the normal distribution and therefore give better results where statistical formulae assume normality of distribution.

"2. There is a constantly high correlation between logarithms of egg counts based on the examination of one stool and logarithms of number of female or total worms recovered after administration of an anthelmintic. Average of two or three counts—adjusting to "basis formed stools"—or using eggs per day, does not appreciably change the correlation coefficient.

"3. The fact that eggs are concentrated in small stools is confirmed here, but the usual classification of stool as formed and unformed is not a sufficiently good indication of stool size to justify its use.

"4. The decrease in egg production per female as the worm density increases would seem to be a rather common phenomenon in this group of worms. It is sufficiently marked to make it impossible to obtain one factor for estimating the number of worms from egg counts, which will apply over the entire range of worm densities.

"5. The greater egg production of *Ancylostoma duodenale* is confirmed, although the exact relation between the egg production of the two worms needs further controlled study.

"6. In reporting results of hookworm surveys the per cent. of persons with eggs in the stool shows the proportion of the population infected, and the average logarithms of egg counts in those infected, with its standard deviation, shows the degree of infection in this group.

"7. There are certain large differences in estimating eggs per gram per female worm in different experiments, which cannot be explained at the present time. Where it is necessary to know the number of worms one must determine the relation between egg and worm counts under the conditions prevailing at the time. For most cases, however, it is not necessary to know the number of worms; studies can be made using egg counts only.

"8. Opinions concerning injury caused by hookworm infestations will continue to vary greatly until more accurate measures are available for determining the degree of the infestation and of the resulting injury. It seems, however, that some individuals show depression of hemoglobin with fairly light infestations.

"9. The type of control work indicated is best decided by the local health officer, who is in a position to determine the relative importance of his public health problems."

[The list of references is limited to material published in the United States. The Old World does not deserve this neglect. It has in fact considered the matter and has anticipated the most important of these conclusions by nearly two years, and that without the use of logarithms (this *Bulletin*, Vol. 28, p. 227.).] *C. L.*

STUMBERG (John E.). **Cutaneous Retention of Infective Larvae of the Dog Hookworm, *Ancylostoma caninum*, and the Inflammatory Reaction to Skin Penetration.**—*Amer. Jl. Hyg.* 1932. Jan. Vol. 15. No. 1. pp. 186–205. With 2 plates. [18 refs.]

"Repeated skin infections on the same area of skin of white mice had no demonstrable effect upon the number of larvae which could be isolated (by Baermann apparatus) from that area of skin twenty-four hours after the last infection. The same experiment repeated on dogs gave varying results. The conclusion is drawn that a local acquired immunity due to repeated skin infection has not been demonstrated. There seems to be some evidence that subcutaneous injections of extract of larvae caused a retention of larvae in the skin during penetration, but this is not definitely established. It is doubtful whether local passive immunization by subcutaneous injection of antihookworm sera had any effect on the retention of larvae, though some of the results considered by themselves might indicate such an effect. Two control animals given a skin infection without previous treatment showed results which indicated that the variability of the method itself was at fault. Histological study of the areas of skin showed that there was no relation between experimental procedure and degree of reaction. The finding of larvae in serial sections was also independent of the number recovered by isolation. Attempted immunization had no effect on the fate of intradermally injected dead larvae. Areas of skin previously infected were characterized by an intense proliferation of fibrocytes in the dermis, especially the *stratum papillare*; the degree of reaction here seemed related to the number of previous infections. In one animal there was noted a phenomenon, the presence of mitoses in endothelial and adventitial cells of vessels in the hypodermis, which was unrelated to experimental treatment. In no case was there present a round cell infiltration such as has been described for local immune reactions. The conclusion is reached that the reaction to skin penetration was due to tissue injury by the larvae and not to an immune reaction to the larvae themselves." *C. L.*

FÜLLEBORN (F.). Ueber die durch die Larve von *Ancylostoma caninum* verursachten Hauterscheinungen. [**Skin Eruptions caused by Larva of** *A. caninum*.]—Reprinted from *Scritti Medici in Onore del Sen. Prof. U. Gabbi* (*Giorn. di Clin. Med.*). 1930. pp. 37–43. With 1 plate. [10 refs.]

Fülleborn describes symptoms following the penetration into his skin of, so he concludes, a single larva of *A. caninum* in August 1929. After handling dog's food containing many larvae of this hookworm he experienced near the nail of the left middle finger an itching which his experience with penetration of strongyloides larvae made him believe to be ominous. Four days later there was swelling over the middle joint, but excised skin showed nothing, yet 2 hours later, iodine having been applied, it was judged that the larva could be felt above the metacarpophalangeal joint and half an hour later there was swelling on the radial side of the little finger. A week later the back of the hand swelled, the swelling spreading in 3 days to the forearm and middle finger with vesiculation and bruising, and about a fortnight after its onset the swelling had reached the arm. A surgical colleague feared there was septic infection. Penetration of *A. caninum* larvae into another person's skin was without any clinical signs. Fülleborn points out that repeated strongyloides infections have made his own skin very sensitive, so that a typical wheal follows vaccination with dried *A. caninum* substance. *C. L.*

AFRICA (Candido M.). **Studies on the Activity of the Infective Larvae of the Rat Strongylid,** *Nippostrongylus muris*.—*Jl. Parasitology*. 1931. June. Vol. 17. No. 4. pp. 196–206.

This has an interest and importance in its analogies with the behaviour of hookworm larvae. The infective larvae of *N. muris* are inveterate migrants. Travel of eight inches both vertically and laterally was actually observed and it is noted that probably many times this distance can be covered, but that moisture conditions must be optimum. Larvae were found on the glass walls outside a water trap 2 inches wide and 2 cm. deep. Since those larvae [like hookworm larvae] cannot swim, they must not only have crossed the trap by crawling along its bottom [like hookworm larvae] but, so it is held, must have crawled vertically up the smooth glass sides under water [and have pierced the resistance of the surface tension with nothing to push against, which hookworm larvae cannot do although with a little assistance from say cotton fibrils they evidently can]. It is believed that larvae are negatively heliotropic, but account is not taken of the possible lethal effects of sunlight which HEYDON [this *Bulletin*, Vol. 26, p. 554] proved for hookworm larvae. *C. L.*

ESPIÉ (A.). Premier cas tunisien de *Strongyloides stercoralis*, Bavay. [**First Case in Tunis of** *S. stercoralis* **Infestation.**]—*Arch. Inst. Pasteur de Tunis*. 1931. Dec. Vol. 20. No. 3. pp. 317–320.

In about 1,000 examinations in the author's laboratory this is the first occasion on which Strongyloides larvae have been detected; nor have other observers in Tunis reported otherwise. The larvae measured in general 230 to 280 μ long by 15 to 16 μ wide and had the characters of Strongyloides larvae as given in text-books. *C. L.*

MATONO (A.). Entwickelungsstudien über die *Strongyloides stercoralis.* (II. Mitteilung.). [**Development of** *S. stercoralis.*]—*Fukuoka-Ikwad-aigaku-Zasshi.* 1931. Oct. Vol. 24. No. 10. [In Japanese. German summary pp. 101–102.]

Cell division, apparently of the egg, is described in detail. It is particularly noted that it does not fit into the usual scheme of metazoa, in that it does not follow that of nuclei; for multinucleated daughter cells result, pointing to parthenogenesis. *C. L.*

SCHUCHAT (J. A.). Die diagnostische Methode von Fülleborn, die Methode der Perianalabstriche und Dehelminthisation als Invasionsindexe des *Enterobius vermicularis* Leach. 1853. [**Diagnostic Methods for** *E. vermicularis.*]—*Rev. Microbiol. Epidémiol. et Parasit.* 1931. Vol. 10. No. 2. pp. 203–213. [28 refs.] [In Russian. German summary pp. 213–214.]

Schuchat compared techniques for the diagnosis of Enterobius, namely that of FÜLLEBORN [presumably the Hamburg cover glass method] and that of perianal or rectal smears, both seeking eggs; and the search of stools for the threadworms themselves after an anthelmintic, the drugs used not being noted in the abstract. The first gave positive percentage results in 19·8 per cent. of children in boarding schools, in 3·2 of children not in these and in no adults. Corresponding figures for the second method were 62·7, 35·5 and 33·3, and for the third 79·8, 58·1 and 37·5. The totals of those examined by the 3 methods were 299, 299 and 196. Tests of material from under the nails and from the nasal mucosa should not be preferred unless for some reason the other tests cannot be used. *C. L.*

FENG (Lan-chou). **Filariasis in China with Special Reference to its Distribution and Transmission.**—*Nat. Med. Jl. China.* 1931. Aug.-Oct. Vol. 17. No. 4/5. pp. 464–474. With 4 figs. on 1 plate. [15 refs.]

The author's work concerns itself essentially with the unhappy Woosung district near Shanghai. Five mosquitoes here are essentially domestic: *Anopheles hyrcanus sinensis, Culex taeniorrhynchus, C. pipiens, Aëdes albopictus,* and *Armigeres obturbans.* Filarial larvae do not reach the infective stage in the last three. In central Woosung Chen most mosquitoes in July and August were *C. pipiens*; 13 per cent. were infected but never with infective larvae. In the town and neighbouring villages 16·6 per cent. of *A. h. sinensis* were positive for filarial larvae, 16 per cent. of the larvae being infective. The course of development in this last is traced. Preventive measures are discussed. *C. L.*

RAO (S. Sundar) & IYENGAR (M. O. T.). **The Escape of the Filaria Larva from the Proboscis of** *Culex fatigans.*—*Indian Jl. Med. Res.* 1932. Jan. Vol. 19. No. 3. pp. 941–944. With 4 figs. on 1 plate.

A *Culex fatigans* infected with *Mf. bancrofti* was fed on a volunteer, stunned by a shake, and put on a slide with a small cover lightly laid on

it to prevent its escape should it recover. While being examined a larval filaria began to emerge from the extreme tip of the labella at first slowly and then more rapidly. Within a few seconds of the commencing of emergence, and when rather more than half was outside the proboscis, it was killed by Bles solution and the specimen preserved. Emergence was non-traumatic, and not through Dutton's membrane.

C. L.

i. O'Connor (F. W.) *Filaria bancrofti*—**Destruction of Adult and Embryo in Man.** [Demonstration.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1932. Jan. 30. Vol. 25. No. 4. pp. 227–228.

ii. Fairley (N. Hamilton). **The Skin Test and Complement Fixation Reactions in Filariasis.** [Demonstration.]—*Ibid.* pp. 220-221.

These two demonstrations illustrated pathological changes and antigen based tests in filariasis.

i. This demonstration fell into 3 series—*a*. Sections of adult worms: in some, healthy female worms had the anterior parts of the uteri crammed with sheaves of straightly extended microfilariae, in others the death of worms was shown as caused by clotted lymph or obliteration of the lymphatic by polypoidal encroachment of hypertrophied endothelial layer. *b*. Death of microfilariae by calcification and fracture in lymph glands, this often being accompanied by necrosis of the surrounding gland tissue. Microfilariae were shown in the afferent lymph vessels; none have been found in the efferent ones. *c*. Death of microfilariae in masses in polyp-like growth of granulation tissue at the reflection of the tunica vaginalis—a veritable microfilarial cemetery. Since O'Connor had found 50 parent worms in examination of restricted areas of persons showing merely enlarged groin glands or small hydroceles, Manson's belief in hyperfilariation was amply confirmed.

ii. This was a demonstration of the matters dealt with in this *Bulletin*, Vol. 28, p. 679—the skin test and complement fixation reactions.

It was pointed out that "natives coming from endemic areas often gave positive skin tests in the absence of collateral evidence of filarial infestation, the presumption being, in such instances, that they were old cases in which sensitisation followed by natural cure had occurred. It was pointed out that the excellent series of slides shown on behalf of Professor O'Connor fully bore out this theory of spontaneous recovery from *Filaria bancrofti*, for in them dead worms and embryos in various stages of disintegration were strikingly depicted."

Two contrasting elephantoid cases were shown. In one microfilariae had been present a year earlier and the skin test was markedly positive; in the other both tests were negative, the man had never been in an endemic area but had several times been treated for streptococcal lymphangitis. A loa case showed both tests markedly, while a control with ulcerative colitis had no reaction to intradermal antigen reaction, but one closely resembling that which appeared in the loa case was induced by the injection of histamine, thus confirming Lewis's hypothesis. *C. L.*

i. RODHAIN (J.). Les filaires de l'Afrique tropicale ; rôle pathogène. Les réactions allergiques qu'elles provoquent et le diagnostic de celles-ci. [**Filariae of Tropical Africa ; Pathogenicity and Allergic Reactions.**]—*Bull. Soc. Path. Exot.* 1931. Dec. 9. Vol. 24. No. 10. pp. 882–897. [13 refs.]

ii. —— & DUBOIS (A.). **A Contribution to the Study of Intradermal Reactions in Human Filariasis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1932. Mar. 31. Vol. 25. No. 5. pp. 377–382.

i. Rodhain deals with *L. loa, O. volvulus* and *A. perstans* which are stated to be allied not only anatomically, but from the biological standpoint, in that the embryos of all circulate in the hope of being absorbed by an invertebrate blood sucker. Regarding *L. loa* he has identified as such partly calcified worms encysted in the mesentery but without any surrounding inflammation ; living or dead, these worms are held to produce no appreciable reaction, even those found in abscesses are held to have no share in their formation. Regarding *A. perstans* the only lesions he has seen are Calabarlike swellings or erysipelatoid swellings of the feet disappearing on rest. The production of an abscess by *O. volvulus* rests hitherto, it is affirmed, on the single case reported by Dyce SHARP and the possibility of infection without nodule formation is cited as needing more research ; urticarial pruritus occurred in 3 of 9 Europeans and was localized to the neighbourhood of a nodule ; eosinophilia has varied from 4 to 35 ; HISSETTE's report [*ante*, p. 83] of cranial nodules and ocular complications in part of the Belgian Congo, the condition supposedly typical of Central America, is referred to. It is held as thoroughly established that elephantiasis is the result of recurrent microbic, especially streptococcal, lymphangitis, that the rôle of the filaria is limited to favouring lymphatic obstruction, and that in onchocerca infection this is produced in the *lymph capillaries** by microfilariae; but the very different incidence of elephantiasis associated with onchocerciasis in different regions shows the need for investigation. " Lizard skin " was noted in one of 9 infected Europeans and an excised portion showed sparse microfilariae with diffuse leucocytic infiltration. Following further discussion there are reported the results obtained by the use of the dirofilaria antigen supplied by FAIRLEY [*ante*, p. 83], the full report being considered below.

ii. After recapitulating tests already reported [*ante*, p. 83], those made by intradermal injection of 0·25, 0·2 and 0·1 cc. of Fairley's 0·5 per cent. dirofilaria antigen are described. In 6 cases of loa infection a typical positive immediate reaction followed. Delayed local reactions occurred ; in one case the site was dissociated from that of the injection. In 3 perstans infections there were equally definite immediate reactions, delayed reactions being added in two. Three cases of onchocerca infection were tested. In two the only visible nodule had been excised a year earlier ; both were given 0·1 cc. of the antigen ; there was a definite positive reaction in one and a partially positive one in the other. The third who had two nodules gave a positive reaction to 0·1 cc. of this antigen and, when a cyst was excised 8 days later, to 0·2 cc. of this and to 0·1 cc. of normal saline mixed with juice from the worm in the excised nodule. Of 15 controls, one gave a " pseudo-reaction " the wheal reaching 2·7 cm. in diameter.

* Italicized in original.

The routine injection of 0·25 cc. of antigen is advised. Microfilariae have been discovered in the skin of 3 of 4 onchocerca cases, two being without dermatosis.

[Rodhain's statement that the occurrence of onchocerca abscess rests on the single case of Dyce SHARP requires modification. At the Laboratory Meeting of the Royal Society of Tropical Medicine and Hygiene held in March, 1932, Dr. C. C. CHESTERMAN, who has courteously furnished the information of which this is an abstract, showed a female and several male *O. volvulus* which had been removed from one of a number of abscesses in a negro coming from near Stanleyville, in Belgian Congo. The other abscesses showed no trace of worms. Dr. CHESTERMAN showed also an elephantoid scrotum weighing 1 lb., convoluted like a brain, with subcutaneous tissue more solid and less oedematous than that commonly attributed to *F. bancrofti* in this region, and showing larvae of *O. volvulus* in the skin. He points out that BRUMPT in his " Précis de Parasitologie " mentions the occurrence of this worm in abscess cavities.] *C. L.*

GALLIARD (H.). Recherches sur les filarioses au Gabon occidental. [**Filariases in Western Gabon.**]—*Bull. Soc. Path. Exot.* 1932. Feb. 10. Vol. 25. No. 2. pp. 167–174. [13 refs.]

In Gabon, lying just south of the equator in French Equatorial Africa, infections by *Loa loa* and *Acanthocheilonema perstans* are common but, especially the former, less common than in adjacent regions. The percentage of infected was found to vary greatly even in areas close to one another, so that at certain points in the forest nearly all were infected, at others women and children seemed to escape. In general, children between 5 and 12 were the most infected with *A. perstans*, and old people little so. Elephantiasis and onchocerca tumours were rare. *Mf. bancrofti* has not been detected. *C. L.*

DE LA TORRE (Ignacio). Sur l'onchocercose au Mexique. [**Onchocerciasis in Mexico.**]—*Bull. Office Internat. d'Hyg. Publique.* 1931. Nov. Vol. 23. No. 11. pp. 2017–2020.

The infected number 15,000 in the State of Chiapas and 5,000 in that of Oaxaca. Failure of extirpation of nodules to produce cure is attributed to the carelessness of the sick. The campaign now takes the form of travelling brigades with doctor and entomologist. Their difficulties are pointed out and include the widespread diffusion in streams of simulium larvae and the impossibility of moving these brigades about during the rainy season. *C. L.*

SILVA (Raphael). **Ocular Onchocercosis.**—*Southern Med. Jl.* 1932. Feb. Vol. 25. No. 2. pp. 113–117.

The progressive clinical and anatomical changes in the eye are minutely described. Some have implications of general as apart from specialist interest. In 1925 Silva after several examinations of an eye which had slight loss of clarity of vision saw " in the vitreous humor a filiform body of extraordinary refringence having the approximate size of three papillary diameters, with spontaneous movements. This body was golden on a red background with ordinary illumination and silver on a blue background on anerythral illumination. With Gullstrand's

ophthalmoscope I could see the shadow of this moving body." He believed this to be a filaria. Having found microfilariae in the choroid and posterior two-thirds of the cornea in sections of eyes, "Torroella could confirm his finding *in vivo* with Koeppe's microscope on seeing microfilariae creeping on the corneal surface. The parasites can be discovered in the anterior chamber or in the iris as worm-like organisms with active movements and changing forms of 8, 6 spirals." Then having found that plasmochin solution, 1 in 1,000, had no ill effect when injected into the anterior chamber of rabbits "he tried it on onchocercosis patients, observing with the corneal microscope the death of the parasites." He has seen good results on the eye troubles after removal of adjacent onchocerca cysts, but adds that microfilariae will continue to live inside the structures of the eye and that he has seen them living a year after extirpation of the cysts. This seems to imply Silva's belief that these microfilariae have come from the adult worms excised with the cysts, so it is well to note that he adds :

"Unfortunately, one year and a half after operating upon a patient in Mexico City, where no transmissible agents are found, we have seen new cysts appear and the microfilariae still abundant in the subcutaneous tissues." *C. L.*

MOHAMMED (Abdel Shafi). **The Transmission of Human and Bovine Onchocerciasis.**—*Ann. Trop. Med. & Parasit.* 1931. Dec. 31. Vol. 25. Nos. 3 & 4. pp. 509–519. [2 refs.]

This is a historical survey. At the end the point is made that as BLACKLOCK showed [this *Bulletin*, Vol. 24, p. 531], the distribution of nodules in the African and American forms of *O. volvulus* seems explicable on the habits of man and simulium, and this conclusion has now been strengthened by the discovery that a simulium is responsible for transmission in America. It is suggested that adequate investigation of simulium in Australia is the necessary preliminary to prevent the heavy annual loss involved in the formation of *O. gibsoni* nodules in cattle there. *C. L.*

RAYNAL (Jean). Sur une méthode pratique de recherche des microfilaires dans le derme, chez les sujets atteints d'onchocercose du Guatémala. [**Demonstration of Microfilariae in the Dermis in Onchocerciasis.**]—*Marseille-Méd.* 1931. Dec. 25. Vol. 68. No. 36. pp. 821–822.

The method is to pick up with forceps a piece of skin near an onchocerca nodule or the edge of the chronic thickening which follows an erysipelatoid lesion, snip it off including dermis with fine scissors, place it for not less than 10 to 15 minutes in normal saline at 30° to 37°C. and pipette off the bottom layer with the microfilariae which have escaped from the tissue. The centrifuge makes richer preparations. *C. L.*

GUTIÉRREZ V. (Luis). La fijación del complemento con sangre de enfermos de onchocercosis. [**Complement Fixation with the Blood of Onchocerciasis Patients.**]—*Rev. Mexicana de Biol.* 1931. Jan.-Feb. Vol. 11. No. 1. pp. 1–8.

Onchocerca nodules were digested in artificial gastric juice to liberate the parasites which were subsequently well washed, dried between filter

papers, and thoroughly triturated with different solvents including physiological saline and alcohol. In addition a third batch of antigen was prepared as an alcoholic extract of the acetone and ether insoluble residues. The total mixture, i.e., liquid and sediment as well as the clear supernatant fluid after centrifugation, was tested for antigenic properties with each of the three extracts. In the test itself a little less than 1/10 of the anticomplementary dose was used. As only the saline extract yielded consistently negative reactions with normal sera, a 2 per cent. saline extract left for 8 days in the refrigerator was employed in the subsequent tests. With this antigen positive reactions were obtained in all cases suffering from onchocerciasis as well as from syphilis and mal de pinto.

Gutiérrez concludes that these results indicate the presence of onchocerca antibodies in the blood and suggests that the false reaction obtained in syphilitics are probably due to defective technique, but until this source of error has been eliminated the reaction can have no diagnostic value in onchocerciasis.

[Any alcoholic extract of tissue or parasite acts to a variable degree as a Wassermann antigen when used in sufficient concentration. It therefore becomes essential to standardize these helminthic extracts in the presence of strongly positive Wassermann sera, subsequently using a dilution of antigen well outside the zone of positive reaction with syphilitic sera. If the potency of the extract, considered as an helminthic antigen, is not sufficient to stand this dilution it cannot be regarded as a satisfactory antigen for diagnostic serological work.]

N. Hamilton Fairley.

VOGEL (Hans.). Onchocercosis und Augenerkrankungen in Mexiko und Guatemala. [**Onchocerciasis and Eye Affections in Mexico and Guatemala.**]—Reprinted from *Med. Welt.* 1931. No. 25. 7 pp. [Inst. for Ship & Trop. Diseases, Hamburg.]

A survey of the literature dealing with the subject. *C. L.*

OWEN (H. B.) & HENNESSEY (R. S. F.). **A Note on Some Ocular Manifestations of Helminthic Origin occurring in Natives of Uganda.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1932. Jan. 30. Vol. 25. No. 4. pp. 267–273. With 1 text fig.

A number of cases have been seen with yellow, circular nodules about 2 mm. in diameter on the bulbar conjunctiva associated with oedema of the lids and proptosis. Section of excised nodules showed that they consisted of inflammatory tissue, with necrotic areas surrounded by a zone of endothelial cells, some being multinucleated. No bacteria were found in them and a guineapig remained well after inoculation with a nodule. Within the necrotic areas there might be clear spaces which in turn might be occupied by a parasite 0·07 mm. in diameter. Its identification with *Thelazia* or *Habronema* is discussed, the latter being dismissed on the ground that longitudinal crests are not obvious in the sections made. [It must then be some artefact which gives the impression in the microphoto illustrated.] *C. L.*

NORONHA (A. J.). **A Note on a Filarial Worm found in Sections of a Nasal Tumour excised from a Child, with Special Reference to the Embryo.**—*Jl. Trop. Med. & Hyg.* 1932. Mar. 1. Vol. 35. No. 5. pp. 74–76. With 6 figs. (5 on 1 plate).

Further study has been made of the worm already described [*ante*, p. 84]. The uterus fills the entire coelomic cavity and is filled with embryos. These have no sheath, it is now concluded, the bodies originally reported as such being apparently embryos in various stages of degeneration. The embryo is transversely striated with a gradually tapering tail and resembles that of *D. medinensis* [as does the whole genital system.] *C. L.*

SHERWANI (A. H. K.). **Neostibosan in Chyluria.**—*Indian Med. Gaz.* 1932. Feb. Vol. 67. No. 2. pp. 83–84.

An intermittent haematochyluria with microfilariae cleared up after intramuscular injections of neostibosan. In all, ten injections were given, the first three when the man was an in-patient, the others when an out-patient, the dose rising from ¾ grain to 5 grains [0·3 gm.]. The editor notes that RAO is preparing for publication a paper which confirms this action of neostibosan. *C. L.*

GHOSH (P. K.). **Microfilariae in the Sputum.**—*Indian Med. Gaz.* 1932. Feb. Vol. 67. No. 2. p. 84.

Two cases are cited where microfilariae were found in blood-stained sputum coughed up in the early morning. In one, acid fast bacilli were found; in a third, what was believed to be a filarial sheath. In relation to Ghosh's note that he knows of no mention of this condition in recent literature, an editorial note draws attention to a case published in 1923 [this *Bulletin*, Vol. 20, p. 631]. *C. L.*

BACIGALUPO (Juan). Importance du sondage duodénal dans le diagnostic et le traitement des distomatoses hépatiques.—*Bull. Soc. Path. Exot.* 1931. Oct. 14. Vol. 24. No. 8. pp. 670–672. [3 refs.]

BARNEOUD (J.). La bilharziose vésicale dans le Sud Marocain.—*Arch. Inst. Pasteur d'Algérie.* 1931. Sept. Vol. 9. No. 3. pp. 476–480. [7 refs.] [Bureau of Hyg., Marrakech.]

FIESCHI (A.). Le anemie da anchilostoma.—*Haematologica.* Pavia. I. Arch. 1932. Vol. 13. No. 2. pp. 145–167. [40 refs.] French summary.

GULATI (A. N.). Is Paragonimiasis likely to spread in India?—*Indian Jl. Med. Res.* 1932. Jan. Vol. 19. No. 3. pp. 761–764. With 1 map in text. [12 refs.]

HU (Stephen M. K.). Studies on Host-Parasite Relationships of *Dirofilaria immitis* Leidy and its Culicine Intermediate Hosts.—*Amer. Jl. Hyg.* 1931. Nov. Vol. 14. No. 3. pp. 614–629. With 5 figs. [8 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ., Baltimore.]

ICASIANO (M. C.). Specific Suggestions for the Control of Intestinal Parasites among School Children.—*Monthly Bull. Philippine Health Serv.* 1931. June. Vol. 11. No. 6. pp. 294–305.

KHAW (O. K.). Historical Notes on *Fasciolopsis buski* (Lankester, 1857) Odhner, 1902.—*Nat. Med. Jl. China.* 1931. Aug.-Oct. Vol. 17. No. 4/5. pp. 475–487. [35 refs.] [Peiping Union Med. College, Peking.]

KODAMA (T.). On a Rhabditis Type Parasite which was discovered during Health Examination of School Children in Kanagawa Prefecture.—*Jl. Public Health Assoc. Japan.* 1931. Nov. Vol. 7. No. 11. pp. 2–4.

DE LANGEN (C. D.). Verschijnselen aan hart en bloedvaten bij de mijnwormziekte.—*Nederl. Tijdschr. v. Geneesk.* 1932. Jan. 2. Vol. 76. No. 1. pp. 13–18.

LARROUSSE (F.). Parasites vermineux, cristaux fuchsinophiles acido-résistants et réactions hyperplasiques.—*C. R. Soc. Biol.* 1932. Mar. 4. Vol. 109. No. 8. pp. 666–668. With 2 text figs. [1 ref.]

MOTAIS (F.). Considérations sur la pathogénie de la sparganose oculaire.—*Bull. Soc. Path. Exot.* 1931. Dec. 9. Vol. 24. No. 10. pp. 915–919.

MÜLLER (Giuseppe). Un focolaio di anchilostomiasi fra contadini in Provincia di Ancona.—*Arch. Ital. Sci. Med. Colon.* 1932. Feb. 1. Vol. 13. No. 2. pp. 108–116. English summary (5 lines).

NAGOYA (Takeguma). Fate of *Anchylostoma caninum* Larvae Orally or Percutaneously Transmitted to the Proper Host, Dog fed on Vitamin Deficient Diet. (First Report.) Experiment on Puppies fed on Vitamin A Deficient Diet. (Second Report.) Experiment on Puppies fed on the Diet Deficient in Vitamin B. (Third Report.) Histological Investigation on Puppies fed on Vitamin A Deficient Diet, those fed on Vitamin B Deficient Diet and those fed on Normal Diet. (Fourth Report.) Experiment on the Normal White Mouse, White Mouse fed on Vitamin A Deficient Diet and White Mouse on Vitamin B Deficient Diet.—*Japanese Jl. Experim. Med.* 1931. Dec. 20. Vol. 9. No. 6. pp. 573–585. [23 refs.]; pp. 587–593. [2 refs.]; pp. 595–602. [6 refs.]; pp. 603–611. [Govt. Inst. for Infectious Diseases, Tokyo.]

NAKAJIMA (Katsumi). Experimental Study on the Development of *Anchylostoma duodenale*. (First Report.) Development in the Rabbit of Larvae of *Anchylostoma duodenale* Dubino previously treated with the Cell Emulsion of Human Organs.—*Japanese Jl. Experim. Med.* 1931. Dec. 20. Vol 9. No. 6. pp. 553–568. With 14 figs. on 2 plates. [Govt. Inst. for Infectious Diseases, Tokyo.]

NAKAJIMA (Katsumi). Experimental Study on the Development of *Anchylostoma duodenale*. (Second Report.) The Development of Larvae of *Anchylostoma caninum* Ercolani in the Normal Host, Dog, and in the Abnormal Hosts, Rabbit, Guinea Pig, and White Rat.—*Japanese Jl. Experim. Med.* 1931. Dec. 20. Vol. 9. No. 6. pp. 569–572. With 10 figs. on 2 plates. [7 refs.] [Govt. Inst. for Infectious Diseases, Tokyo.]

PITTALUGA (G.) & GOYANES (J.). Contribucion al estudio de la *Onchocerca volvulus*.—*Medicina Paises Cálidos*. Madrid. 1932. Mar. Vol. 5. No. 2. pp. 124–153. With 12 text figs. and 12 figs. on 2 plates. [2 pages of refs.]

SUZUKI (S.). Researches into the Life-History of *Fasciola hepatica* and its Distribution in Formosa, especially on the Determination of the First Intermediate Host and Some Experiments with Larvae Freed from their Cysts Artificially.—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1931. Dec. Vol. 30. No. 12 (321). [In Japanese. With 3 plates. English summary pp. 97–100.] [Med. College, Taihoku, Formosa.]

TUBANGUI (Marcos A.). Worm Parasites of the Brown Rat (*Mus norvegicus*) in the Philippine Islands, with Special Reference to Those Forms that may be transmitted to Human Beings.—*Philippine Jl. Sci.* 1931. Dec. Vol. 46. No. 4. pp. 537–591. With 19 text figs. [63 refs.]

TROPICAL OPHTHALMOLOGY.

A REVIEW OF RECENT ARTICLES. XVII.*

Eyelids.—For the relief of *spastic entropion* HUGHES[1] recommends alcohol injection into the outer portion of the orbicularis muscle near its attachment in the lower lid to the external palpebral ligament. The needle is passed through the muscle fibres close to the margin of the lower lid for a distance of 4 or 5 mm. and five minims of novocaine solution is injected. The syringe is now detached from the needle, which is left in place, and a fresh syringe containing ninety-five per cent. alcohol is fitted. About five minims of alcohol is then injected into the tissues. The procedure is stated to be painless.

Conjunctiva.—OWEN & HENNESSEY[2] have found the condition of "bung-eye" and "bulge-eye" to be frequently associated with the formation of small, yellow nodules in the bulbar conjunctiva. These nodules are circular, raised and yellow, and average about 2 mm. in diameter. They are situated in the deeper layers of the conjunctiva in close relationship with the episcleral tissue. They usually lie fairly close together and cause but little inconvenience. Examination of the nodule revealed in many cases the presence of a nematode worm, the zoological status of which has not yet been determined, though possibly it may belong to the genus *Thelazia.* Several of the cases presenting nodules were also affected with "bung-eye" or "bulge-eye" or with both these conditions, and the authors consider the worm to be the cause of all these diseases.

Trachoma.—PILLAT[3] urges ophthalmologists in China to adopt a simple, definite scheme when considering and reporting on the characteristics of the disease in that country, in order that its incidence may be properly estimated and effective measures against it instituted. He suggests a questionary which contains ten main headings with various subdivisions. These concern the age, sex and occupation of the patient, the type of the disease and the presence and character of complications and of secondary infections. He remarks: "Far too often in the literature of the subject trachoma is made responsible for blindness generally, and especially so in a country like China where trachoma as a whole has a mild character and a tendency to eliminate itself."

MEYERHOF[4] has furnished a most interesting review of the epidemics of ophthalmia which afflicted the English, French and Turkish armies during the fighting in Egypt at the time of the Napoleonic war. As long ago as the fourteenth century an Egyptian oculist remarked, "the inhabitants of Egypt are more frequently attacked by ophthalmia

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* For the Sixteenth of this series see Vol. 28, pp. 965-972.

[1] HUGHES (Wendell L.). Spastic Entropion; a Simple Procedure for its Cure.—*Amer. Jl. Ophthalm.* 1931. Jan. Vol. 14. No. 1. pp. 34–35.

[2] OWEN (H. B.) & HENNESSEY (R. S. F.). A Note on Some Ocular Manifestations of Helminthic Origin occurring in Natives of Uganda.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1932. Jan. 30. Vol. 25. No. 4. pp. 267–273. With 1 text fig.

[3] PILLAT (A.). Trachoma in China. Proposals for a Uniform Recording and for Uniform Statistics.—*Nat. Med. Jl. China.* 1931. Dec. Vol. 17. No. 6. pp. 755–763.

[4] MEYERHOF (Max). A Short History of Ophthalmia during the Egyptian Campaigns of 1798–1807.—*Brit. Jl. Ophthalm.* 1932. Mar. Vol. 16. No. 3. pp. 130–152. [3 pages of refs.]

than other people on account of the abundance of dust and sand in their land," and in the sixteenth century an Italian physician noted the seasonal character of the epidemics. The author states that genuine trachoma is frequently a complication or sequela of an acute catarrhal or of an acute or chronic purulent conjunctivitis, and it may exist as a primary disease or develop slowly after the healing of the acute condition. The destructive character of the epidemics under consideration was due to gonococcal infections. Extragenital transmission occurs in hot climates.

MICHAIL & VANCEA[5] recognise that it is unsafe to draw conclusions from trachoma produced experimentally on animals other than man and perhaps the anthropoid apes. Inoculation of human volunteers has suggested to them that the incubation period of the experimental form of the disease is from five to seven days. The experimental disease has definite acute and subacute stages at its commencement and thus differs from the naturally acquired disease. Inoculation to be successful must be made on the surface of the conjunctiva. Failure to infect two volunteers from trachoma tissue obtained from patients with only one eye diseased has led them to consider whether trachoma affecting one eye only is really trachoma at all. BARONI & MICHAIL[6] have found that the virulence of trachoma virus can be well preserved in a mixture of equal parts of glycerine and Tyrode liquid kept at 60°C. and in human plasma at room temperature. Human plasma when inactivated is the best medium. Aqueous humour of rabbits and the plasma of dogs proved quite unsuitable.

DIXON[7] has found trachoma fairly prevalent amongst the negroes at Tshibambo in Katanga. During eighteen months he treated no fewer than 251 cases of the disease in his hospital there. Twenty-nine per cent. of the patients suffered from pannus and thirty-six per cent. had trichiasis. The negro does not readily submit to a prolonged treatment, and, owing to his tolerance of ocular discomfort, is likely to regard himself as cured before the course is completed. Pigmentation is sometimes observed in the late stage of the disease. The adoption of European habits by the natives of the country is conducive to the spread of trachoma owing to the use of dirty handkerchiefs, towels and pillow-cases. TSUKAHARA[8] has examined over fifteen thousand schoolchildren in Taihoku, (more than half being Chinese resident in Formosa and the remainder Japanese), and furnished statistics relating to the occurrence of trachoma amongst them. Nearly twenty-three per cent. of the scholars were infected; but less than half of these made any complaint of eye defect, and only a small proportion (29 per cent.) were undergoing any treatment. Those whose school standard was "good" showed an incidence of 17 per cent. infection, "fairly good" 23·5 per

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[5] MICHAIL (D.) & VANCEA (P.). Quelques faits expérimentaux concernant le trachome.—*C. R. Soc. Biol.* 1931. Oct. 16. Vol. 108. No. 28. pp. 286–287.

[6] BARONI (V.) & MICHAIL (D.). Recherches sur la conservation du virus trachomateux.—*C. R. Soc. Biol.* 1931. Oct. 16. Vol. 108. No. 28. pp. 289–290.

[7] DIXON (Patrick K.). Notes sur le trachome.—*Bull. Méd. du Katanga.* 1931. Vol. 8. No. 5. pp. 131–140. [10 refs.]

[8] TSUKAHARA (Y.). Ergebnisse der Trachom-Untersuchung bei Schulkindern in Taihoku, insbesondere ueber den Einfluss des Trachoms auf die Schulerfolge der Kinder, sowie die z. Z. lokal übliche Trachom-Behandlung. *Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1931. Nov. Vol. 30. No. 11 (320). [In Japanese. German summary p. 91.]

cent., and "satisfactory" 23·9 per cent. The author pleads for the better education of the public in hygienic matters in general and in the dangers of trachoma in particular.

HARSTON[9] has again insisted upon the value of ultra-violet rays in the treatment of trachoma. He uses a 6–10 ampere tungsten arc lamp and places the patient at a distance of three feet from it. The eyes are irradiated through the closed lids for a period of from two to three minutes. Adrenalin is instilled in order to render the lids as bloodless as possible. The treatment is repeated at three-day intervals.

The *Revue Internationale du Trachome* for October 1931 contains, in addition to articles previously published elsewhere and already reviewed, a note by JUNÈS[10] upon the results of the anti-trachomatous measures undertaken by him in the schools of Sfax in Tunis. Amongst the European scholars these results were remarkably favourable, and the percentage of those affected by the disease fell from 25 per cent. to 4 per cent. in the year 1929–1930. The florid type of trachoma was almost completely eradicated from these schools. Success in the Arab schools was also marked but less striking. In the first year the incidence fell from 50 per cent. to 33 per cent. and in the second year from 35 per cent. to 25 per cent. The difference is accounted for by the more unfavourable home surroundings of the Arab scholars. The benefits of this campaign were not confined to the schools in which it was conducted but affected the whole population since the seasonal epidemics of acute conjunctival inflammations became much milder in character. In the issue for January 1932 Donato CATTANEO[11] states that amongst 1,600 trachomatous patients he found 16 in whom only one eye was affected. Careful examination with the slit-lamp, however, revealed that the apparently healthy eye was also affected but so mildly as to escape observation by the ordinary methods of examination. [It is important when dealing with an apparent trachoma affecting only one eye to make certain that the conjunctival condition is not a manifestation of some constitutional trouble such as syphilis, focal sepsis, or the "tuberculous diathesis."] V. MORAX[12] discusses the relationship between swimming-bath conjunctivitis and trachoma together with the significance of inclusion bodies. TALBOT[13] reports on the prevalence of the disease in Southern Tunis. The infected scholars there vary from 53 per cent. in some districts to 97 per cent. in others. The majority of the districts show an incidence of between 70 and 80 per cent. E. REDSLOB[14] has analysed the figures relating to the health of the Alsatian soldiers conscripted by Germany in the war. Most of these were, for political reasons, employed on the

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[9] HARSTON (Montagu). Ultra-Violet Ray Treatment of Trachoma.—*Brit. Jl. Ophthalm.* 1931. Dec. Vol. 15. No. 12. pp. 717–718.

[10] JUNÈS (E.). Note sur les résultats de la lutte anti-trachomateuse poursuivie dans les écoles de la ville de Sfax de 1929 à 1931.—*Rev. Internat. du Trachome.* 1931. Oct. Vol. 8. No. 4. pp. 230–236. With 3 diagrams.

[11] CATTANEO (Donato). Sul tracoma unilaterale.—*Rev. Internat. du Trachome.* 1932. Jan. Vol. 9. No. 1. pp. 1–8.

[12] MORAX (V.). Conjonctivite folliculaire dite de piscine. Notes de laboratoire. —*Rev. Internat. du Trachome.* 1932. Jan. Vol. 9. No. 1. pp. 8–12.

[13] TALBOT. Trachome dans les territoires militaires du sud tunisien.—*Rev Internat. du Trachome.* 1932. Jan. Vol. 9. No. 1. pp. 12–19.

[14] REDSLOB (E.). Le trachome des soldats alsaciens transportés au front russe.—*Rev. Internat. du Trachome.* 1932. Jan. Vol. 9. No. 1. pp. 24–27.

Eastern front and passed several years in Poland and Russia. About 200,000 Alsatians were thus brought into intimate contact with the inhabitants of countries heavily infected with trachoma. Yet it is surprising to find that only three of the soldiers contracted trachoma on this front. He suggests (1) that Alsatians are particularly resistant to the disease, (2) that the adult age of the soldier rendered him less likely to contract the complaint, (3) that the European type of the disease is less virulent than the North African. ROQUES[15] has found the Jewish quarter in Rabat (Morocco) a nidus of trachoma. As elsewhere the schools form a fruitful source of infection ; the number of infected scholars varies from 26 to 85 per cent. according to the hygienic standard of the institution. Those schools which are associated with the synagogues show the highest rate of disease.

JANAWOSKA[16] discusses the question of the mutual relationship of tubercle and trachoma. He examined five hundred tuberculous patients in Kiev and found amongst them only five trachomatous subjects, and even in these the eye disease was of a mild type. Nuri FEHMI[17] also writes on this subject and reports the successful employment of tuberculin therapy in a case of acute trachoma with pannus. He regards the existence of lymphatism as a contributing and aggravating cause ; hence the success of tuberculin treatment. [It should be noted that a phlyctenular type of conjunctival inflammation may sometimes simulate trachoma.]

Cornea.—EL-TOBGY and WILSON[18] have had good results from platinum chloride in *tattooing corneal leukomata.* They have followed the method described by KRAUTBAUER. Two solutions are used. The first is a two per cent. solution of platinum chloride (tetravalent) in sterile water. This solution is not stable if exposed to light. The second is a two per cent. watery solution of hydrazine hydrate freshly prepared. The eye is cocainized and washed with sterile water. The surface of the leukoma is denuded of epithelium with a Graefe knife. The platinum solution is applied to the denuded area for two minutes. The application is made by means of a wool mop and care is taken to prevent any excess solution from flowing on to the healthy cornea. On removing the mop the hydrazine hydrate solution is dropped continuously on to the leukoma for twenty or twenty-five seconds. About ten drops usually suffice. The eye is then washed out with sterile distilled water. Reduction should be complete in two minutes when the eye is flooded with saline solution and the dressing applied.

The same observers[19] have reported their experience of the use of phenolaine in the treatment of *corneal nebulae.* Forty patients underwent the course of treatment and every care was taken to eliminate sources of error in estimating any benefit derived. The majority of the

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[15] ROQUES. Un foyer important de trachome à Rabat (Maroc). Note sur l'activité du dispensaire antitrachomateux Israélite au cours de l'année 1930.—*Rev. Internat. du Trachome.* 1932. Jan. Vol. 9. No. 1. pp. 36–40.

[16] JANAWOSKA. Le trachome et la tuberculose.—*Rev. Internat. du Trachome.* 1932. Jan. Vol. 9. No. 1. pp. 47–52.

[17] FEHMI (Nuri). La tuberculinothérapie dans le trachome.—*Rev. Internat. du Trachome.* 1932. Jan. Vol. 9. No. 1. pp. 44–45.

[18] EL-TOBGY (A. F.) & WILSON (R. P.). Tattooing of the Cornea.—*Fifth Ann. Rep. Giza Memorial Ophthalmic Lab., Cairo, 1930.* pp. 97–102. With 4 figs. on plates 11 & 12. [12 refs.]

[19] WILSON (R. P.) & TOBGY (A. F.). Phenolaine in the Treatment of Corneal Nebulae.—*Bull. Ophthalm. Soc. Egypt.* 1931. Vol. 24. pp. 117–122.

scars resulted from corneal ulceration following gonorrhoeal ophthalmia. Most cases showed some slight improvement in their vision after treatment, but this was accompanied by very little rarefaction of the scar tissue. It is concluded that phenolaine does not appear to possess any definite advantages in this respect over the ordinary remedies such as yellow oxide of mercury and dionine. The treatment, too, may sometimes give rise to undesirable sequelae.

HERBERT[20] argues that Wright's success in producing experimentally *Superficial Punctate Keratitis* by the use of filtrates of epithelial emulsion from the disease does not necessarily exclude the micro-organism described by himself in 1901 as being the real cause of the condition. During an epidemic of the disease the mere trauma of the corneal inoculation might permit the prevalent organism to attack successfully the tissues. (The references to Herbert's work are *The Ophthalmic Review.* 1901. Vol. xx. pp. 339–345, and *The Ophthalmoscope* 1904. Vol. ii. pp. 8 & 9.) Herbert emphasizes the very limited distribution of the organism in, or on, the corneal epithelium. To find it the cornea must be stained with two or three instillations of a strong solution of fluorescine and those areas which are stained most deeply should be selected for examination.

The prevalence of *Keratomalacia* in the Dutch East Indies is commented on by DE HAAS[21] and the opinions of his countrymen regarding the disease are discussed by him. He found children between the ages of two and five years to be the most affected. He attributes the disease to the combination of bad hygienic conditions, unsuitable diet, ascarides, intestinal and other infections and avitaminosis-A. The whole constitutes a vicious circle of disease. OWEN and HENNESSEY[22] have published a very informative paper on the disease. They have had considerable experience of the condition in Uganda finding it common amongst the gaol population ; the free villagers, however, seldom suffer from night-blindness, xerophthalmia and keratomalacia. The diet of these latter consists basically of plantains and sweet potatoes with some vegetables, nuts and fruits. Meat, milk, eggs, butter and ghee are consumed in negligible quantities. The prison diet consists of maize flour, dry beans, ground nuts, and a small quantity of meat supplemented by sweet potatoes. The authors report the case of a man aged about 20 who suffered from severe biliary cirrhosis, and in the course of the disease developed keratomalacia in both eyes although his ordinary diet was in no way deficient in accessory food factors. They believe that xerophthalmia occurred in this case as a result of interference with the part played by the liver in the metabolism of vitamins, the intake of the latter being ample. And they conclude that the liver is of primary importance in the process leading to the utilisation of ingested vitamin A by the tissue cells. Although vitamin A [deficiency] is the most important single factor in the causation of xerophthalmia and keratomalacia, it is linked with other

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[20] HERBERT (H.). The Micro-Organism of Indian Superficial Punctate Keratitis.—*Brit. Jl. Ophthalm.* 1931. Nov. Vol. 15. No. 11. pp. 633–637.

[21] DE HAAS (J. H.). On Keratomalacia in Java and Sumatra (in Particular upon the Karo-Plateau) and in Holland.—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1931. Vol. 20. Pt. 1. pp. 1–11. With 8 figs. on 5 plates. [20 refs.]

[22] OWEN (H. B.) & HENNESSEY (R. S. F.). Keratomalacia in Liver Disease.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1932. Mar. 31. Vol. 25. No. 5. pp. 367–375. With 2 figs. on 1 plate. [11 refs.]

factors, which in threshold cases may actually determine the onset of gross lesions.

Glaucoma.—ELLIOT[23] has published some hints for the general practitioner on the treatment of glaucoma. These are specially valuable coming from such an authority on the disease. The question of medical treatment versus operative is discussed and it is decided that each case must be judged on its own merits. No patient should be submitted to operation if judicious medical treatment suffices to keep the disease *in statu quo*. General principles for the preservation of good bodily health must be strictly observed by the glaucomatous patient; he must avoid over fatigue (though moderate use of the eyes is probably beneficial) and excesses of all kind. Such sources of strain as stooping are harmful. Local treatment consists in the use of meiotics and in the employment of ocular massage; the importance of this latter measure is still insufficiently appreciated. An operation should be advised if treatment on these lines fails to control the disease. Failure is indicated by a maintenance of pathological tension as shown by the tonometer, by a progressive diminution of central vision, and by a progressive curtailment of the visual field. This latter is a symptom of grave significance. Failing light sense is another sign which must not be disregarded. Cupping of the optic disc is a less valuable indication than is a progressive contraction of the visual field. The patient's expectation of life and the rate of progress of the disease must be balanced against each other when weighing the question whether to operate. Once operation is decided upon, it should not be delayed; the earlier it is performed the better is the prognosis. It is important to keep the patient cheerful and in a hopeful frame of mind; therefore it is probably wiser to discuss the unfavourable aspects of any operation with his relatives only.

The same authority[24] has reviewed briefly the technique of the operation devised by him, and considered some of the possible complications. "Safety after operation depends largely on the thickness of the protective covering." Therefore it is important to keep as close to the sclera as possible when raising the wide-angled flap. The cornea should be split and not cut into with a sharp instrument. A sharp trephine blade should be used and interference with the uvea should be limited to the minimum. "So long as the trephine hole remains iris-free it does not really matter whether a piece of iris has been removed or not." As a rule the dangers involved in fishing for iris in the trephine hole are greater than those involved by the policy of letting well alone. A continuous suture is employed to unite the edges of the flap. Detachment of the choroid seldom causes serious trouble, and patients with this complication do better when not confined to bed. Thin prominent scars may be suitably treated by the application of silver nitrate solution. The pupil must be kept well dilated for some weeks after the operation.

GENERAL DISEASES.—*Onchocerciasis.*—SILVA[25] has briefly recorded the efforts made by the Public Health Department in Mexico to eradicate onchocerciasis. He considers that the disease is spread by sandflies,

[23] ELLIOT (R. H.). Some Points in Connexion with the Treatment of Glaucoma. —*Brit. Med. Jl.* 1931. Dec. 26. pp. 1169–1171.

[24] ELLIOT (R. H.). Some After-Thoughts on Trephining for Glaucoma.—*Amer. Jl. Ophthalm.* 1931. Oct. Vol. 14. No. 10. pp. 999–1004.

[25] SILVA (Rafael). Brief Statement concerning Onchocercosis in Mexico.— *Amer. Jl. Ophthalm.* 1931. June. Vol. 14. No. 6. pp. 518–519.

and that *S. avidum*, *S. mooseri* and *S. ochraceum* are the vectors in Mexico. The subcutaneous tumours principally occur in the hairy parts ; and a plastic iritis and a punctate form of keratitis constitute the ocular complications.

VOGEL[26] has remarked the attention paid to onchocerciasis by Journals devoted to tropical helminthology and the descriptions of the widespread incapacity caused by the ocular disorders due to this disease. Fortunately some of the reports appear to exaggerate the evil. He has, therefore, summarized the experiences of ROBLES, HOFFMANN and other oculists who have met with the disease. The author describes the inflammations which affect the uvea and cornea and considers them due to an absorption of toxin from the parasite.

Syphilis.—KIRWAN[27] has found syphilis to be appallingly common in India and to be a frequent cause of loss of sight. Early and energetic treatment of ocular syphilis and of syphilis in general is therefore most important. Interstitial keratitis, iritis, irido-cyclitis, and optic atrophy are common ocular complications of the disease. A chronic conjunctivitis, due to syphilitic tarsitis, may be mistaken for trachoma. The routine treatment consists in weekly intramuscular injections of metallic bismuth and sulfarsenol. Arsenical preparations should be administered with caution and it is usually advisable to halve the dose in ocular syphilis.

The Fifth Annual Report of the Giza Memorial Laboratory contains a record of several interesting cases. Comprehensive post-graduate courses in ophthalmology are included in the activities of this well-equipped institution in addition to the ordinary work of pathological examinations and research. Naturally much attention was paid to the study of trachoma and to the investigation of the Bacterium granulosis of NOGUCHI. So far no proof is forthcoming that this micro-organism has any place in Egyptian trachoma. Spring catarrh is fairly common in Egypt, and it is stated that radium is on the whole more successful than any other form of treatment for this intractable disease. The appendix includes a discussion on the aetiology of trachoma by the Director R. P. WILSON. It is suggested that Noguchi's bacterium may be only pathogenic for the human conjunctiva under certain conditions.

The Eighteenth Annual Report of the Ophthalmic Section of the Egyptian Ministry of the Interior records the statistics of the various institutions in that country devoted to the treatment of eye disease. A study of these statistics reveals many interesting facts. Thus the number of patients treated for chronic glaucoma (6,380) exceeds that of those admitted on account of senile cataract (4,988). Secondary glaucoma admissions amounted to 8,185 patients. 526,406 patients in all were treated during the year. Combined extraction is the routine operation for senile cataract, and Elliot's sclero-corneal trephining that for chronic glaucoma. Snellen's operation is by far the most favoured for the treatment of trichiasis and entropion. It was performed 62,322 times. *H. Kirkpatrick.*

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[26] VOGEL (Hans). Onchocercosis und Augenerkrankungen in Mexiko und Guatemala.—Reprinted from *Med. Welt.* 1931. No. 25. 7 pp.

[27] KIRWAN (E. W. O'G.). Syphilitic Diseases of the Eye.—*Indian Med. Gaz.* 1931. Oct. Vol. 66. No. 10. pp. 560–564. With 4 charts in text.

DENGUE.

MURRAY (G. A.). **Dengue Fever.**—*Health.* Canberra. 1931. Nov. Vol. 9. No. 11. pp. 105–111.

It would appear that in Queensland dengue has become endemic in the north, and periodically spreads in epidemic form to invade the southern coastal areas of Queensland and occasionally the north coast section of New South Wales. In 1914 an epidemic of dengue was reported in Darwin, Northern Australia, and again in 1927–28, the infection probably spreading from the north of Western Australia. The author refers to the work of CLELAND and BRADLEY and considers that the provisions of the new dengue convention should be of assistance in the prevention of infection from overseas. *D. Harvey.*

ST. JOHN (Joe H.) & HOLT (Rufus L.). **A Dengue Vaccine prepared from** *Macacus philippinensis.*—*Amer. Jl. Trop. Med.* 1931. Sept. Vol. 11. No. 5. pp. 325–336. With 6 charts in text.

Following on the work of HINDLE in preparing a yellow fever vaccine from the spleen and liver of infected monkeys the authors have attempted to prepare a dengue vaccine on the same lines utilizing *Macacus philippinensis* from a dengue-free area.

These monkeys have been shown to be susceptible to dengue and the virus is present in their blood from the 5th to the 10th day after exposure to bites of infected Aedes or injection of blood from human cases. The strain of dengue virus utilized had been obtained originally from a naturally acquired case and had subsequently been employed in experimental work for more than one year. A young monkey was infected by the bites of infective Aedes ; one week later a batch of clean mosquitoes were fed on this monkey and subsequently shown to be infective by feeding on a susceptible human volunteer. The monkey was then killed and the spleen and liver removed, cut into small pieces and ground up with sand in a sterile mortar and mixed with 13 cc. of 9·0 per cent. saline solution. On the following day 117 cc. of sterile distilled water was added, thus suddenly bringing the strength of the solution to 0·9 per cent., the idea being that the sudden change in the osmotic pressure would cause the rupture of the tissue cells ; carbolic acid was then added sufficient to give a 0·5 per cent. strength and the vaccine was stored in the ice box. 30 cc. of the clear amber coloured supernatant liquid was taken and was tested for sterility in a variety of ways and by animal injection. Five volunteers each received one cc. of the vaccine ; no reaction was noted. A week later two of these volunteers received a second dose of the vaccine and ten days later mosquitoes, known to be infective, were fed on them ; both developed typical attacks of dengue. The experiment was repeated with vaccine prepared from a second monkey and the 3 volunteers of Exp. 1 who had not been tested were reinoculated on two occasions with the new vaccine and then exposed to the bites of infective mosquitoes ; one of these men developed dengue within 24 hours, one did not develop dengue and one had a typical attack after an incubation period of 6 days. Volunteer No. 1 had probably contracted dengue in the ordinary way and it was discovered later that No.2 had been in hospital for two days with fever and was therefore immune.

Conclusions :—The dengue vaccine prepared from the liver and spleen of infected monkeys did not protect volunteers from an attack of dengue but there was evidence that the attacks in the inoculated were very mild. It was shown that Aedes can be infected by feeding on monkeys during the period when the virus is present in the blood.

D. H.

NOMURA (S.) & AKASHI (K.). Ueber Todesfälle infolge von Haemorrhagie im Verlauf des Denguefiebers. [**Death from Haemorrhage in Dengue.**] —*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1931. Oct. Vol. 30. No. 10 (319). [In Japanese. German summary p. 84.] [Govt. Hosp., Tainan, Formosa.]

Five fatal cases of dengue are recorded in children aged 4 to 10 years. Death was due in all to severe haemorrhage from the bowel with vomiting of blood. [No further account of the disease is given in the German summary.] *D. H.*

SYSSINE (A.). Les mesures contre la dengue en U.R.S.S.—*Bull. Office Internat. d'Hyg. Publique.* 1931. Sept. Vol. 23. No. 9. pp. 1624–1626.

DE VRIES (D.). Het bloedbeeld bij knokkelkoorts.—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1931. Nov. 15. Vol. 71. No. 16. pp. 1358–1360. With 3 text figs.

TYPHUS AND UNCLASSED FEVERS.

MORRIS (E. Sydney). **The Incidence of Endemic Typhus (Brill's Disease) in New South Wales.**—*Rep. Director-General of Public Health, New South Wales, Year 1930.* pp. 47–51. With 2 charts and 1 plan.

During the past three years, 1928–1930, there have been seven cases of endemic typhus (Brill's disease) reported in New South Wales. Brief summaries of these cases are given. The Weil-Felix reaction was positive in all. Five out of the seven were in males. There was a history of the prevalence of rats in two. *D. Harvey.*

MCGILLIVRAY (W. S.). **Brill's Disease or Pseudo-Typhus.**—*Med. Jl. Australia.* 1931. Dec. 5. 18th Year. Vol. 2. No. 23. pp. 716–719. With 1 chart in text.

The author refers to the discovery of pseudo-typhus or Brill's disease in Australia. He made blood cultures from some of these cases but although on one occasion he isolated a *Bact. faecalis-alkaligenes* nothing else of interest was found. However, from the sputum of one case he isolated a bacillus which when inoculated into rabbits produced a serum which agglutinated *Proteus vulgaris* X_{19} Warsaw in a dilution of 1/300. *D. H.*

EMANUELS (B. J.). Enkele onderzoekingen over tropical typhus en (of) mijtekoorts in Atjeh. [**Research on Tropical Typhus and (or) Mite Fever in Atjeh.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1932. Feb. 15. Vol. 72. No. 4. pp. 196–205. With 4 charts in text and 2 figs. on 1 plate.

Between March and July 1931 there were 35 cases of clinical tropical typhus among members of military patrols in N. Atjeh. 12 of these cases are quoted in some detail; 4 of them showed an ulcer as a primary sore, and might therefore be classified as mite fever (previously known as pseudo-typhus SCHÜFFNER). Serologically (agglutination of *Proteus* Kingsbury) all the cases were positive. Out of 3 cases in which inoculation in guineapigs was attempted one gave a typical positive result.

The author holds that tropical typhus and mite fever are identical, the only difference being that in the latter the special character of the bite of the transmitting *Trombiculus* (greater depth?) causes the ulcer known as the primary sore. *W. J. Bais.*

TAGAMI (Y.). **The Resemblance of the Socalled Typhus Manchuricus to the Mexican Typhus reported by Dr. Moaser [Mooser] and also to the Brill's Disease by its Clinical Symptoms: Further on the Rickettsia Body in the Cells of the Tunica Vaginalis Testis.**—*Sei-I-Kwai Med. Jl.* 1931. June. Vol. 50. No. 6 (544). pp. 1–3.

Typhus Manchuricus is a mild form of typhus similar to Brill's disease. The Weil-Felix reaction is positive; the disease can be transmitted to guineapigs and monkeys and in the former animal gives a reaction similar to that of Mexican typhus and the Rickettsia bodies are readily demonstrated in the tunica vaginalis. *D. H.*

DYER (R. E.), RUMREICH (A. S.) & BADGER (L. F.) **The Typhus-Rocky Mountain Spotted Fever Group in the United States.**—*Jl. Amer. Med. Assoc.* 1931. Aug. 29. Vol. 97. No. 9. pp. 589–594. With 3 charts. [30 refs.]

This paper is based largely on work already published by the authors in the *Public Health Reports*. The first section is mainly historical and refers to the discovery by BRILL (1910) in America of the fever now described by his name.

It has now been established that there are two typhus-like diseases in the eastern states of North America : endemic typhus (Brill's disease) and spotted fever, identical with Rocky Mountain spotted fever of the western States. The differential diagnosis from the clinical picture is given ; two points being the difference in the type and distribution of the rash and the fact that mortality in the spotted fever cases is 20 per cent. whereas in the endemic typhus cases it is nil. Two strains of the eastern spotted fever virus were isolated and shown to be identical with the virus of the State of Montana (Rocky Mountain), but distinct from that of endemic typhus. Laboratory investigations have also clearly proved that the vector of the eastern spotted fever virus is the dog tick *Dermacentor variabilis* and the virus has been passed through several of the stages of development of the tick. Infection to human beings can be carried either by the bite of the larvae or adults or by crushing of infected ticks removed from dogs.

It has been suspected for some time that the vector of endemic typhus was a parasite of the rat, and the authors have isolated from rat fleas (*X. cheopis*) the virus of the disease and have produced in guinea-pigs the typical reactions, and have shown by crossed immunity experiments that this virus is identical with the virus of endemic typhus (human strain), and also with the virus of epidemic typhus, but differs from that of spotted fever either of eastern or western origin.

D. H.

NICOLLE (Charles). Sur l'intérêt d'une étude expérimentale du virus exanthématique des vallées andines. [**Proposed Study of Typhus Virus in the Andine Valleys.**]—*Arch. Inst. Pasteur de Tunis.* 1931. Dec. Vol. 20. No. 3. pp. 324–327.

The author has recently returned from a visit to Mexico where he has studied the type of typhus fever which occurs there. Clinically it was noted that the disease in Mexico is milder and the rash distinctly more abundant than in Europe. But the most striking difference is in the action of the virus on experimental animals. MOOSER has shown that inoculation of the Mexican virus into guineapigs produces a septicaemia with an acute inflammatory reaction of the testicle and tunica vaginalis, with oedema ; numerous rickettsias can be demonstrated and the fluid withdrawn is highly infective for other guineapigs. On the other hand the Old World virus does not produce this reaction but acts principally on the brain which provides the most highly infective tissue. Also when rats are infected with the Old World virus they show no fever reaction, but inoculation of the Mexican virus into rats produces fever and a severe reaction which is often fatal. It is suggested that the rat may be a carrier of the virus and although not responsible for the epidemic spread, due to lice, may conserve the virus.

The author suggests that his auditors (members of the Société Argentine de Pathologie du Nord) should procure the virus which is known to exist in the Andine valleys and determine if it is of Old World type or corresponds with the Mexican virus of MOOSER. *D. H.*

RAYNAL (J.). Le typhus exanthématique guatémaltèque doit être indentifié au typhus exanthématique mexicain. [**Guatemalan Typhus identical with Mexican Typhus.**]—*Bull. Soc. Path. Exot.* 1932. Jan. 13. Vol. 25. No. 1. pp. 49–57. With 6 charts in text.

Typhus in Guatemala resembles tabardillo in its clinical manifestations and is carried by lice. The author has tested the serum of five cases of the local type of fever with four different strains of *Proteus vulgaris* X_{19}. A positive reaction was obtained with all four strains. In the following year 17 more cases were tested and all except one gave a positive Weil-Felix reaction. Inoculation of the blood of these Guatemalan cases into guineapigs produced a mild febrile reaction but a very marked scrotal reaction similar to that obtained in Mexican typhus. *D. H.*

CUSHING (H. B.) & CALDWELL (R. J.). **Sporadic Typhus Fever.**—*Canadian Med. Assoc. Jl.* 1931. Dec. Vol. 25. No. 6. pp. 649–653. With 5 text figs.

This was a fatal case of sporadic typhus occurring in Montreal; typhus or Fränkel's nodules were demonstrated in sections of the skin and Rickettsia bodies in the proliferating endothelial cells. Only 12 cases of typhus have been reported in Montreal in 35 years and these were probably imported; in the case here described the man had lived in Montreal for some years; the authors therefore suggest that the disease may be more common there than is generally supposed. *D. H.*

LILLIE (R. D.). **Pathology of the Eastern Type of Rocky Mountain Spotted Fever.**—*Public Health Rep.* 1931. Nov. 27. Vol. 46. No. 48. pp. 2840–2859. With 29 figs. on 6 plates. [15 refs.]

This account of the pathology of the eastern type of spotted fever is based on post mortem examinations of five cases. The lungs in all were congested and oedematous, exuding pinkish frothy fluid from the bronchi; there was broncho-pneumonia. The liver was not enlarged but the spleen was slightly to moderately so. The brains showed no gross lesions. The testicles were normal in the adult cases.

Microscopic pathology. In all five cases the pia mater showed evidence of dense perivascular lymphocytic infiltration. A similar condition was noted in one case in the choroid plexus, with proliferation of the endothelial lining of capillaries; such lesions were constantly present within the brain substance but were more numerous in the medulla than in the cerebral cortex. These brain lesions fall into 3 classes; (1) those involving vessels and their sheaths; (2) focal proliferative lesions in the brain substance; and (3) focal necroses, these last being dependent apparently on the vascular lesions.

In the liver of one case numerous foci of centrolobular coagulative necrosis were noted; in the kidneys numerous foci of dense lymphocytic, often perivascular, infiltration, with swelling and proliferation

of the endothelium of the capillaries. In the testicles of two cases in young boys haemorrhages and lymphocytic infiltration were marked.

The skin was carefully examined in four cases and in all pericapillary cellular infiltration was noted with endothelial swelling in the capillaries. *D. H.*

LABERNADIE (V.). Syndrome exanthématique au cours d'une épidémie de dengue. [**A Typhus-like Fever occurring in a Dengue Epidemic.**]—*Bull. Soc. Path. Exot.* 1932. Jan. 13. Vol. 25. No. 1. pp. 7–12. With 1 chart in text.

During an epidemic of dengue in Pondichéry, French India, a case of typhus-like fever was noted. The patient developed a profuse maculopapular rash which extended to the face, palms and soles, with very heavy sweating but no stupor nor typhoid state. Lice were not found on the patient or contacts, but a pet dog of the patient had recently been destroyed owing to tick infestation. The Widal reaction was negative but when the Weil-Felix reaction was performed using 3 strains of *Proteus vulgaris* No. 67, Kasauli and Kingsbury, a strongly positive reaction was obtained with the two first or indologenic strains and a modified reaction with the non-indologenic Kingsbury strain. The author considers that this case was one of pseudotyphus or so-called tropical typhus, probably though not certainly carried by the dog tick, *R. sanguineus.* *D. H.*

DYER (R. E.), CEDER (E. T.), RUMREICH (A.) & BADGER (L. F.). **Experimental Transmission of Endemic Typhus Fever of the United States by the Rat Flea** (*Xenopsylla cheopis*).—*Public Health Rep.* 1931. Oct. 9. Vol. 46. No. 41. pp. 2415–2416.

——, ——, LILLIE (R. D.), RUMREICH (A.) & BADGER (L. F.). **Typhus Fever. The Experimental Transmission of Endemic Typhus Fever of the United States by the Rat Flea** *Xenopsylla cheopis.*—*Ibid.* Oct. 16. Vol. 46. No. 42. pp. 2481–2499. With 9 charts and 3 figs. on 2 plates. [16 refs.]

The authors point out that the virus of endemic typhus has been obtained from wild rats in areas where this disease is common in man. Endemic typhus is a disease rather of occupation than of domicile and is usually contracted in occupations connected with food distribution and where rats are numerous. A series of experiments is now described which clearly shows that the virus of endemic typhus can be carried from rat to rat by means of the rat flea *Xenopsylla cheopis.*

In the first experiment infected rats were placed in a cage and 50 rat fleas introduced; some of these fleas were later removed and crushed up; stained films showed the presence of Rickettsia, and emulsion of the fleas, injected into guineapigs, produced infection with the endemic typhus virus. In other experiments clean rats were placed in the cage with infected rats and fleas; two weeks later emulsion of the brains of these clean rats when injected into guineapigs produced infection; again when infected fleas were placed on clean rats in separate cages and these rats were killed two weeks later and brain emulsion injected into guineapigs infection with typhus virus was produced. All these strains of virus were carefully controlled by

crossed immunity experiments and by histological examination of the testicles and brains of the infected guineapigs, also by production of agglutinins for X_{19} in the serum of inoculated rabbits. The authors conclude that the evidence produced points to the rat flea (*X. cheopis*) as a common vector of endemic typhus from rat to rat and from rat to man. *D. H.*

CEDER (E. T.), DYER (R. E.), RUMREICH (A.) & BADGER (L. F.). **Typhus Fever : Typhus Virus in Faeces of Infected Fleas** (*Xenopsylla cheopis*) **and Duration of Infectivity of Fleas.**—*Public Health Rep.* 1931. Dec. 25. Vol. 46. No. 52. pp. 3103–3106. With 2 charts in text.

A few fleas were removed from a cage in which were white rats infected with typhus. These fleas were crushed up and inoculated into 2 guineapigs. The typical reaction to typhus virus resulted in both animals. About 50 fleas were collected from the same box and placed in a sterile test tube ; the following morning all the fleas and eggs were carefully removed from the tube and the faeces remaining were emulsified in saline and injected into 2 guineapigs ; both animals reacted and the strain was carried on through four generations. That the strain was true typhus virus was proved by production of agglutinins in rabbits and the demonstration of the typical histopathological changes in the brain of guineapigs and the presence of Rickettsia in the tunica vaginalis. The virus in the faeces of the fleas remained viable for at least 36 days, and it appears from further experiment that infection is not due as a rule to the bite of the flea but to the rubbing of infected faeces into wounds in the skin. *D. H.*

DYER (R. E.), CEDER (E. T.), WORKMAN (W. G.), RUMREICH (A.) & BADGER (L. F.). **Typhus Fever—Transmission of Endemic Typhus by Rubbing either Crushed Infected Fleas or Infected Flea Feces into Wounds.**—*Public Health Rep.* 1932. Jan. 15. Vol. 47. No. 3. pp. 131–133.

Fleas fed on infected rats were crushed in a mortar and the proceeds placed on the shaved abdomen of two guineapigs ; the areas were then scarified. Both developed a slight febrile reaction but no scrotal enlargement. However when emulsions of their brains and spleens were inoculated into five guineapigs all developed fever and typical scrotal reaction. The same experiment was repeated, using the faeces of the infected fleas, with a like result ; modified reaction in scarified animals but definite reaction in subinoculated animals. The infection in fleas has now been shown to last as long as 52 days. *D. H.*

MONTEIRO (J. Lemos). Typho endemico de S. Paulo. [**Endemic Typhus of S. Paulo.**] I. Fórmas do typho na America e uma nova infecção observada em S. Paulo. II. Comportamento experimental do virus. III. Comportamento experimental do virus em certos simios ("Macacus," Cebus e Alauatta). IV. Infecção experimental por inoculação do virus na camara anterior do olho. V. Algumas propriedades do virus: filtrabilidade, resistencia á acção da glycerina, ao desseccamento e á congelação.—*Brasil-Medico.* 1931. Nov. 21, 28. Dec. 5, 12 & 19. Vol. 45. Nos. 47, 48, 49, 50 & 51. pp. 1096–1100.

[15 refs.]; 1109–1113. With 23 graphs & 6 figs. in text. [8 refs.]; 1140–1142. With 2 text figs. [2 refs.]; 1163–1165. With 16 graphs. [2 refs.]; 1188–1190. [11 refs.].

——, DA FONSECA (Flavio) & PRADO (Alcides). VI. Pesquisas sobre a possibilidade da transmissão experimental do virus por "Ixodidae," VII. Pesquisa do virus em alguns arthropodos sob condições naturaes. VIII. Os ratos como possiveis depositarios do virus na natureza.—*Ibid.* 1932. Jan. 16, Feb. 20 & 27. Vol. 46. Nos. 3, 8 & 9. pp. 49–52. [5 refs.]; 169–172. [10 refs.]; 193–195.

I. American types of the Disease and a New Form seen in S. Paulo.—This is the first of a proposed series of articles. The author reviews the subject, describing the classic type, the endemic typhus of N. America, the Mexican (tabardillo), and Rocky Mountain spotted fever. In a section in which the serological reactions are discussed, mention is made of other types, the Australian, Italian, Marseilles fever, *fièvre boutonneuse* of Tunis, the two Malay forms and the tsutsugamushi disease. The S. Paulo type gives a doubtful reaction with *Proteus vulgaris* X_{19}, negative with the Kingsbury strain. As regards the vector experimental transmission has been obtained with certain species of tick, but fleas, bugs, mites are also being investigated. The rat is probably the host.

II. Virus Experiments.—The experiments described in this paper are preceded by remarks on the epidemiology of the disease, based on 44 cases, 15 in 1929, 20 in 1930 and 9 to the end of August 1931. The figures relative to nationality incidence are of no value without a statement of the numbers of each at risk. As regards sex 17 were male, 20 female, 6 not stated; 8 were below 10 years of age, and in succeeding decades 13, 13, 3, and one over 40 years; in 6 there was no record. Six were urban, 33 suburban, 5 rural. 34 died, a 77 per cent. fatality.

For experimental work the primary virus was obtained from a patient in the Isolation hospital; later blood from an infected animal taken at the height of the fever, usually the fourth day. 1-3 cc. was used or 1–2 cc. of a 1 in 10 emulsion of brain in normal saline. 300 guineapigs were employed, and also rabbits, rats (*Epimys norvegicus*) and camondongos. After intraperitoneal injection of the virus fever lasting 4 to 8 days succeeded an incubation period of 3–4 days and death occurred in about 70 per cent. of the guineapigs. 20–25 per cent. of them gave a scrotal reaction, mild or severe. In rabbits similar fever was produced. but the disease did not usually kill [figures are not given]. The rats might give no systemic reaction—*infection inapparente*—but Rickettsia were present in the peritoneal cells. The condition resembled in certain respects tabardillo and Rocky Mountain fever.

III. Experiments with Monkeys.—Seven *Macaca rhesus*, 2 *Cebus apella* and 1 *Alouatta caraya* were inoculated intraperitoneally. The macacus after 2–4 days' incubation reacted with fever lasting as a rule for 4 days and terminating in sudden death. In some there were haemorrhages appearing on the last day or after death. One Cebus died like the macaques, the other recovered after fever persisting for 10 days; the Alouatta showed, after an incubation of 3 days, fever which ended fatally 3 days later.

IV. Intraocular Inoculation of Virus.—The virus as before, blood or brain emulsion, was inoculated in the anterior chamber of the eye in 13 rabbits, 42 guineapigs and 3 macaques. The dose employed was usually 0·1 cc., rarely 0·2 cc. From the second to the fifth day a local inflammatory reaction was observed together with fever as when the

virus was injected intraperitoneally. The local reaction—conjunctivitis, iritis, and corneal opacity—was much more marked in the guinea-pig; only slight in the monkey, but in either case those animals which recovered were refractory to infection by other routes. The virus could be transmitted in series by intraocular injection of the aqueous humour of an ocularly infected animal.

V. Properties of the Virus.—The author demonstrates some further properties of the virus of the local form of endemic typhus. Whether in the citrated blood or as brain emulsion in saline or glucose broth the virus will not pass through either Chamberland L3 or L5, Mandler or Berkefeld N candles. Mere contact with the conjunctiva does not result in infection although the same virus even up to a dilution between 1 in 10,000 to 1 in 1,000,000 is infective when injected subcutaneously or intraperitoneally. Drying for 24 hours reduces the virulence considerably, but the milder symptoms produced are followed by immunity; after 6 days it is avirulent. Its activity is destroyed after 7 days in pure glycerin, but is retained for over 12 but less than 24 days in 50 per cent. of glycerin. Freezing for 6 weeks does not affect the virulence and this is a good method, therefore, of preserving it in the laboratory.

VI. Experimental Transmission by Ticks.—The authors devised series of experiments with *Amblyomma cajennense, Argas persicus* and *Ornithodorus rostratus,* to determine their receptivity for the virus, their infectivity by the faeces or by bite, duration of infectivity, hereditary transmission, and the possibility of infection by the coxal fluid. They found that *A. cajennense* becomes infected after feeding on an infected guineapig and 13 days later injection of the triturated body of the tick will reconvey the disease to another guineapig; that ova from an infected female Amblyomma transmits infection to the larvae which will produce in a guineapig an immunizing *infection inapparente.* Only one experiment was made with *A. persicus* and that yielded no result. With *O. rostratus* the results were not constant; in some cases by feeding on an infected guineapig they themselves became infected and 13 days later the bite would infect another guineapig, but not after 28 days. The coxal fluid contains the virus and can confer immunity when injected. The period of incubation following infection by the bite of the tick was 13 days, considerably longer than that following intraperitoneal inoculation.

VII. Search for Virus in Arthropods.—The authors tested inoculation into guineapigs of the head louse, the bed bug, various species of fleas, ticks and mites, with negative results and conclude that "the study of ecto-parasites in infected parts of the town and its environs, of the epidemiology of the disease and the nature of the virus would indicate that the usual transmitter is probably a rat flea in urban areas and an acarus (Dermanyssidae) or tick (Ixodidae) in suburban and rural districts. The virus may not be exactly the same in the two zones, but further study is needed to test this hypothesis."

VIII.—Rats as Reservoir Hosts.—Rats caught in infected areas were examined and their ectoparasites collected and identified. The animals were then killed, their brains removed aseptically, placed in sterile Petri dishes, emulsified in saline and inoculated into the peritoneum of guineapigs. After 20–30 days the latter were tested for immunity by inoculation of 1000 M.I.D. (minimal infecting dose) of the virus. Altogether 124 rats captured in suburban or rural houses where cases had occurred, and 24 from urban houses were examined.

The experiments are not yet concluded but the authors state that so far they have been led to the conclusion that rats may serve as "depositories of the virus," both urban and rural, more particularly the former, but that the virus in the urban is less virulent than that in rural or suburban rats, a possible corroboration of a hypothesis already advanced that there may be two infections or a single virus with two degrees of virulence. *H. H. S.*

MARCANDIER & PIROT (Robert). Présence d'un virus, voisin de celui du typhus exanthématique, chez les rats des navires de guerre à Toulon. [**Typhus-like Virus in Rats of Toulon War-ships.**]—*C. R. Acad. Sci.* 1932. Jan. 25. Vol. 194. No. 4. pp. 399–401. With 2 charts in text.

21 rats were captured on board the armed cruiser "Paris" on which ship cases of benign typhus had occurred from time to time. These animals were killed and emulsions of the brain inoculated intraperitoneally into 8 male guineapigs; 5 of these developed fever after an incubation period which varied from 7 to 13 days and periorchitis was noted in all. [A similar reaction to that of the Mexican virus.] The infection was passed on in passage to other guineapigs for several generations; monkeys were inoculated from the guineapigs and these animals also developed fever after an incubation period of 6–7 days. In addition the blood serum of these animals tested after recovery from the fever gave a positive Weil-Felix reaction; in one instance the titre was 1/1700. *D. H.*

DOVE (Walter E.) & SHELMIRE (Bedford). **Tropical Rat Mites,** *Liponyssus bacoti* **Hirst, Vectors of Endemic Typhus.**—*Jl. Amer. Med. Assoc.* 1931. Nov. 21. Vol. 97. No. 21. pp. 1506–1510. With 5 text figs.

The strain of virus of endemic typhus utilized in these experiments was obtained from a patient who came under the care of the authors. This man was employed in a café in which rats heavily infested with the tropical rat mite, *Liponyssus bacoti*, were fairly numerous. His blood was inoculated into two male guineapigs which developed the typical reaction of endemic typhus virus with marked scrotal swellings. Guineapigs which had recovered from the fever following inoculation with this local virus were shown to be immune to inoculation with stock typhus fever virus but not to the virus of Rocky Mountain spotted fever.

Rat mites collected from a district where no endemic typhus cases had occurred were shown to be non-infective for guineapigs. Batches of these mites were fed on infected guineapigs and when crushed up and injected into clean guineapigs these animals reacted. In the same way batches of mites fed on infected guineapigs produced infection in clean guineapigs after a period of four days when fed on these animals. The disease was transmitted from guineapig to guineapig by the bites of the tropical rat mite.

There was also evidence of hereditary transmission; larval mites bred from mites which had fed on infected guineapigs proved also to be infective.

In the discussion which followed Dr. MAXCY said he was not satisfied that the authors had successfully infected their guineapigs with typhus virus. Dr. ZINSSER considered that the infection by the mites was a true endemic typhus reaction but that the mite was not the only parasite of the rat which carried the virus from rat to rat or from rat to man; rat fleas and also the bed bug had to be considered.

D. H.

SOUCHARD (L.), MARNEFFE (H.) & LIEOU. Etude expérimentale d'un virus exanthématique isolé d'un cas de typhus, présentant la symptomatologie de la fièvre fluviale du Japon. [**Study of Virus from a Case of Typhus with Symptoms of Japanese River Fever.**]—*Bull. Soc. Path. Exot.* 1931. Oct. 14. Vol. 24. No. 8. pp. 678–708. With 25 text figs. [25 refs.]

The inoculation of this virus, originally obtained from the blood of a case of fever in Indo-China, into guineapigs produced a severe and prolonged fever which in the majority of cases ended fatally. Monkeys, rabbits and rats were also shown to be susceptible but much less so than the guineapig; indeed the disease in rats was "inapparent." Post mortem examination of guineapigs revealed enlarged spleen and congestion of the suprarenals and lymphatic glands. The intraperitoneal method of inoculation was the most certain but intraocular injection produced a typical local reaction, as also did intradermal injection in monkeys. Examination of these lesions and of smears from spleen and brain revealed Rickettsia-like bodies in considerable numbers. The blood, urine and peritoneal fluid were all found to be infective. The author is of opinion that this was a case not of typhus but of Japanese River fever, the chief point of difference being that in this case the virus produced a severe and often fatal fever in guineapigs, whereas as a rule Japanese River fever virus produces only a mild or inapparent reaction in these animals.

D. H.

SPENCER (R. R.). **Expansion of Investigations on Tickborne Diseases by the United States Public Health Service.**—*Public Health Rep.* 1931. Sept. 4. Vol. 46. No. 36. pp. 2097–2101.

As a result of the investigation of Rocky Mountain fever by the Public Health Service, it has been proved that ticks are also carriers of tularaemia. Experimentally the tick has been shown to be infective for many months and to transmit the infection through the eggs to the second generation. Previously these cases in man following tick bite had been diagnosed as tick fever without rash.

As regards prevention of Rocky Mountain fever, progress has been slow but the author and his colleagues are very hopeful that in a vaccine prepared by themselves they have a most effective weapon, and large numbers of people have already been inoculated. The Montana State Legislature have provided funds for the construction of a laboratory to prepare the vaccine; one part of the building being devoted to the rearing of infected ticks on a large scale, 200,000 in a year, from which the vaccine is prepared. In the new building research is also to be carried on, including investigation of Colorado tick fever which differs from spotted fever in that it is rarely fatal, produces no rash and the serum of cases does not give a positive Weil-Felix reaction.

It is of interest to note that a single species of the western tick, *Dermacentor andersoni*, transmits to man by its bite no less than four diseases, namely Rocky Mountain spotted fever, tularaemia, tick paralysis and Colorado tick fever. *D. H.*

TROUP (J. McDonald) & PIJPER (Adrianus). **Tick-Bite Fever in Southern Africa.**—*Lancet.* 1931. Nov. 28. pp. 1183–1186. With 2 charts in text. [17 refs.]

Tick-bite fever of Southern Africa is a definite clinical entity which belongs to the typhus-like diseases that have been described recently in various parts of the world. The disease is similar to typhus but there are various points of difference clinical, pathological and serological.

The bite mark of tick-bite fever is the most characteristic sign; this is a small necrotic sore (the tache noire of Marseilles fever) and is invariably accompanied by painful enlargement of the lymph glands draining the area; such a lesion is of course not found in true typhus. The serum of patients agglutinated the 3 strains of Proteus employed, X_2, X_{19} and Kingsbury strain, in low dilutions during the course of the fever but in increasing titre during convalescence. On the other hand the serum of South African typhus cases agglutinates X_2 and X_{19} in high dilutions during the fever and the Kingsbury strain not at all. In tick bite fever there is a marked lymphocytosis whereas in typhus the neutrophile cells are increased. The disease is apparently carried by the larval stage of the tick and not by the adult, in most cases *Amblyomma hebraeum*, occasionally Rhipicephalus. *D. H.*

PIJPER (Adrianus) & DAU (Helen). **An Agglutination-Curve in Tick-Bite Fever.**—*Jl. Med. Assoc. South Africa.* 1931. Aug. 22. Vol. 5. No. 16. pp. 519–521. With 2 text figs.

A volunteer allowed herself to be bitten by larval ticks collected in a district where tick fever was known to be prevalent. The subject was kept under close observation from the time of the bite and throughout the fever which duly followed; the idea being to record carefully the agglutination reactions with various strains of *Proteus vulgaris*. The clinical course was also carefully observed; fever began on the 10th day and to the satisfaction of the observers (if not the victim) proved severe with intense headache and papular rash. 21 samples of blood were collected from the patient before, during and after the illness and kept in the ice chest, and were tested out against the different strains of Proteus on the same day. Living emulsions from agar cultures of *P. vulgaris* X_{19}, *P. vulgaris* (Kingsbury) and *P. vulgaris* X_2 were employed. The titre for all three commenced to rise during the incubation period and reached 1/100 at the beginning of the fever; the peak of the curve was reached on the 22nd day although the fever ceased on the 19th day reckoned from the date of the bite.

The titre for Kingsbury strain was much higher, 1/400, than that for the other two strains, 1/100. This has not been the experience of the authors in all cases as in some instances the titre for all three strains has been the same. In the present case there was a secondary rise in agglutination titre from the 35th to the 50th day. *D. H.*

FINDLAY (G. M.). **Rift Valley Fever or Enzootic Hepatitis.**—*Trans. Roy. Soc. Trop. Med. & Hyg* 1932. Jan. 30. Vol. 25. No. 4. pp. 229–262. With 9 text figs. & 6 plates (1 coloured).

—— & DAUBNEY (R.). **The Virus of Rift Valley Fever or Enzoötic Hepatitis.**—*Lancet.* 1931. Dec. 19. pp. 1350–1351.

This disease was first described by DAUBNEY in East Africa in 1931. In 1912 there was a heavy mortality in lambs in Naivasha which was almost certainly due to the same disease. No human cases were recorded at that time. A similar epidemic occurred among sheep and lambs in 1930 in the Rift Valley. Infected blood was brought home and inoculated into two lambs; both died within 36 hours. Two of the investigators who did the post mortem on these animals became infected with the virus. Mice, rats and monkeys were shown to be susceptible.

Clinical symptoms in man.—The incubation period varied from 5 to 6 days. The fever was ushered in by headache and pain in the back, shivering and malaise. Conjunctivae were not injected. In one case on the fourth day the temperature fell to normal with profuse sweating; this patient had, however, been given an injection of 10 cc. of immune human serum. No rash was ever observed, and blood cultures were sterile but the blood was highly infective for mice when taken during the fever. In two other cases although the temperature dropped to normal on the 4th day there was a recurrence of fever on the 6th day recalling the saddle back temperature curve of dengue; in another case the fever lasted ten days and convalescence was prolonged. Immunity can be produced by injection of serum of persons who have recently recovered from the disease. In this paper the author gives a full account of the effect of inoculation of the virus into experimental animals and of the post mortem appearances. *D. H.*

i. BROOM (J. C.) & FINDLAY (G. M.). **Complement Fixation in Rift Valley Fever.**—*Lancet.* 1932. Mar. 19. pp. 609–611.

ii. DAUBNEY (R.) & HUDSON (J. R.). **Rift Valley Fever.**—*Ibid.* pp. 611–612. [Summary appears also in *Bulletin of Hygiene.*]

i. Not the least important point connected with Rift valley fever, the aetiology of which was discovered by Daubney, Hudson and GARNHAM, is that the virus is pathogenic for man. The resemblance between the clinical characters of this disease and those of dengue, sandfly fever and yellow fever accentuates the need for accurate diagnosis.

The presence of complement-fixing antibodies can be demonstrated in the blood of infected people and animals. The antigen used in the tests was a 2 per cent. extract of liver of rats and mice dying of the disease. The saline extract was centrifuged and filtered through paper. Chamberland filters appeared to reduce the antigenic value. As far as has been ascertained the complement fixation is specific for Rift valley fever. Control sera from syphilitics, cases of recovered dengue and yellow fever gave no fixation; the antibody persists for at least 6 months after infection.

In one case in a human being and in one monkey fixation occurred when there had been no evidence of infection clinically. The human being had been exposed to infection.

Two sheep sera have been tested. That from a ewe still gave positive reactions three months after infection, but that from a lamb while positive at 14 days was negative at three months.

The antigen seems to disappear from the sera of infected rats and mice more rapidly than from other species of animal. Two to three weeks appears to be about the limit of its persistence. A few experiments show that liver dried over phosphorous pentoxide can be used for the preparation of antigen.

ii. In this paper Daubney and Hudson confirm the susceptibility of certain African rodents to experimental infection, but they do not appear to have been able to produce any evidence of natural infection among them.

While it has been proved that the virus can survive in engorged nymphs of *Rhipicephalus appendiculatus* the adults failed to prove infective. *A. Leslie Sheather.*

TORPY (C. D.). **An Investigation of the Short Fevers at Trimulgherry, 1931.**—*Indian Med. Gaz.* 1931. Oct. Vol. 66. No. 10. pp. 564–567. With 7 charts in text.

These short fevers occur every year in the station and usually just after the outbreak of the monsoon, reaching their maximum about the middle of June, and are coincident with the appearance of the sand flies *P. papatasii* and *P. minutus* and also various mosquitoes, notably *Aedes argenteus*. In 1931, 39 cases occurred among the British troops and none among the Indians ; 22 were in the cavalry and the men who slept in the upper stories of the barracks as a rule escaped. Clinically cases were divided into 2 types : (1) a simple fever lasting 3 to 4 days, and (2) cases with a recurrence of fever on or about the 7th day ; otherwise the two types were similar—flushed face, injected conjunctiva (pink eye), no joint pains and no rash. All were diagnosed "sand fly" fever. One suggestion is that the vector of the simple type is *P. papatasii* and of the recurrent type *Aedes argenteus* ; or that the relapsing type is a form of dengue. *D. H.*

i. PIERAERTS (Georges) Notes cliniques sur la "fièvre rouge congolaise." [**Notes on Red Congolese Fever.**]—*Ann. Soc. Belge de Méd Trop.* 1931. June 31. Vol. 11. No. 2. pp. 189–204.

ii. ——. La fièvre rouge congolaise est-elle la dengue ? [**Is Red Fever Dengue ?**]—*Ibid.* Aug. 31. No. 3. pp. 321–341. [54 refs.]

i. The author refers to papers by LEFROU and LEGENDRE, summarized in this *Bulletin* (Vol. 25, p. 529). He adopts the name given by LEFROU and considers the fever to be a separate entity and not abortive dengue. He observed at least 20 cases in Leopoldville and considers that the disease is infectious and spread from case to case. He gives a careful description of the clinical symptoms ; briefly it is a short fever, 3 to 4 days, with sudden onset characterized by a rash (papulo-macular) which appears on the second day, enlargement of the lymphatic glands with the exception of the inguinal group, and lymphocytosis.

ii. Clinically there are no marked differences between red fever and dengue. Unlike dengue, red fever has no tendency to epidemic spread. Transmission by Aedes or by sand flies has not been demonstrated. *D. H.*

MARMO (A.). **Observations on *Bacillus columbensis* Fever (Castellani's Fever). With Report of Six Cases occurring in Erithrea.**—*Jl. Trop. Med. & Hyg.* 1932. Jan. 15. Vol. 35. No. 2. pp. 20–24. With 6 figs.

This fever was first described by CASTELLANI in Ceylon (1905) and the associated bacillus called *B. columbensis*. There are two types of fever, one similar to the usual typhoid fever curve and the other a prolonged fever with numerous relapses, which may last in all about six months. The author describes six cases met with in his practice. Blood culture and agglutination tests were negative for the typhoid paratyphoid group, but *B. columbensis* was isolated from the faeces in 4 of the cases and the serum of all agglutinated this bacillus (1/400 in 4 instances). *D. H.*

COMBIESCO (D.) & ZOTTA (G.). Présence de la fièvre exanthématique de Marseille à Constantza (Roumanie). Observations cliniques et expérimentales sur le rôle de *Rhipicephalus sanguineus* dans la transmission. [**Eruptive Fever at Constantza : Transmission by Tick.**]—*C. R. Soc. Biol.* 1931. Vol. 108. No. 38. pp. 1279–1280.

Eruptive fever has now been discovered in Constantza, the Rumanian port on the Black Sea ; 32 cases were reported during the hot weather in 1931. In one case a tick (*R. sanguineus*) was removed from a child's abdomen at the beginning of an attack of fever ; the tache noire developed at the site of the bite and the child passed through a typical attack. The dogs in the city are heavily infested with ticks ; ten of these ticks were taken, ground up and emulsified and injected into two volunteers ; both men after an incubation period of 5 days developed typical attacks of fever. *D. H.*

REGENDANZ (P.). Das exanthematische Zeckenfieber. [**Eruptive Tick Fever.**]—*Dermat. Woch.* 1931. Nov. 14. Vol. 93. No. 46. pp. 1765–1769. [15 refs.]

The author refers to Marseilles fever and Tunisian " fièvre boutonneuse " under the name tick fever and gives a detailed description of the rash and clinical symptoms. He divides the fever into 3 periods : 1. A period of 3–5 days with fever, headache and pains in back and limbs. 2. A period of 8 days with fever and rash. 3. A period of recovery without fever but during which the rash persists. He then refers to the discovery of ticks and tick bites on patients and to the work of DURAND and CONSEIL and BRUMPT on the transmission of the disease by means of the dog tick *R. sanguineus*. *D. H.*

LEMAIRE. La maladie de Conor et Bruch. [**Disease of Conor and Bruch.**]—*Rev. Méd. et Hyg. Trop.* 1931. Nov.-Dec. Vol. 23. No. 6. pp. 289–291.

The author after discussing the various names which have been given to " exanthematous fever " of Marseilles suggests that it should receive the name " the fever of Conor and Bruch " in honour of the two workers who first described it in Tunis in 1910. M. BROQUET who

spoke in the discussion did not agree; he considered that the two names "exanthematous fever" and "fièvre boutonneuse" should stand until a more definite agreement had been reached as to the etiology and serology. *D. H.*

COMBIESCO (D.). Sur la nature de la "tache noire" décrite dans la fièvre exanthématique de Marseille. [**The Tache noire of Eruptive Fever.**]—*C. R. Soc. Biol.* 1931. Vol. 108. No. 38. pp. 1281–1282.

The author has noted that intradermal injection of infective blood from cases of fever produces at the site of injection a typical tache noire or primary ulcer; whereas the injection of the same blood subcutaneously or intramuscularly produces no such reaction though infection follows. He suggests that the tache noire is due to a local multiplication of virus with secondary inflammation due to bacteria and possibly a toxic substance injected by the tick. *D. H.*

DES ESSARTS (J. Quérangal) & PRADE (J. V.). Un cas de fièvre exanthématique, observé à Brest. [**Case of Eruptive Fever seen at Brest.**]—*Bull. Soc. Path. Exot.* 1932. Feb. 10. Vol. 25. No. 2. pp. 109–113.

The patient had recently arrived in his ship which had been stationed at Toulon. The case was a mild one but with profuse rash in which some of the elements were distinctly petechial. The Weil-Felix reaction was strongly positive on the 12th day of the disease in dilution 1/1250 and in convalescence at 1/12,400. No lice were present on the patient nor on any of the sailors but rats were very numerous on board and the rat louse and rat flea were found on captured rats. *D. H.*

COMBIESCO (D.). Exaltation de la virulence du virus de la fièvre exanthématique de Marseille par mélange de plusieurs souches. [**Exaltation of Virulence of Eruptive Fever by Mixture of Strains.**]—*C. R. Soc. Biol.* 1931. Vol. 108. No. 38. pp. 1282–1284. [2 refs.]

It has already been shown that the virus of eruptive fever rapidly loses virulence when passaged from man to man or from monkey to monkey and soon produces no reaction at all or only a mild and a typical one. The author has shown, however, that if blood from two or three cases of fever is mixed together and injected into a human subject a very severe type of fever is produced. This procedure enables the virus to be used for pyrexial treatment of nervous diseases. *D. H.*

OLMER (D.) & OLMER (Jean). Nouvelles recherches sur la fièvre exanthématique provoquée. [**Experimental Eruptive Fever.**]—*Bull. Acad. Méd.* 1931. Nov. 17. Year 95. 3rd Ser. Vol. 106. No. 36. pp. 348–353.

The authors inoculated two subjects with an emulsion of crushed up ticks on 28th July; both men developed fever, one on the 6th, the other on the 5th day. From these men 20 cc. of blood was taken every 24 hours and inoculated into volunteers up to the number of 14.

The men who were inoculated during the incubation period did not develop fever but the man inoculated with blood taken on August 2nd, the first day of fever, duly developed the disease after 15 days incubation; the fever in his case lasted 11 days with a profuse eruption; also the man inoculated with blood taken on the 11th August, the last day of the fever, duly developed the disease as did those inoculated with blood taken between these two periods. These people were shown to be immune to later injections of infective blood and it was also shown that the blood of convalescents had protective powers. *D. H.*

DURAND (P.) & LAIGRET (J.). Réceptivité du rat blanc et de la gerbille au virus de la fièvre boutonneuse. [**White Rat and Gerbille Receptive to Virus of Eruptive Fever.**]—*Bull. Soc. Path. Exot.* 1932. Feb. 10. Vol. 25. No. 2. pp. 106–109.

With a view to preserving the virus of eruptive fever in the laboratory the authors inoculated a number of the local rodents. In two instances the white rat and the gerbille became infected by injection of blood from a case of fever. The infection was, however, inapparent. The animals were killed on the 12th day after inoculation and emulsion of the brain inoculated into susceptible volunteers produced a typical attack of fever. *D. H.*

TROISIER (Jean) & CATTAN (Roger) in collaboration with SIFFERLEN Fièvre exanthématique inapparente de l'homme transmise par *Rhipicephalus sanguineus*, virulence pour le singe et le cobaye. [**Inapparent Eruptive Fever of Man transmitted by** *R. sanguineus*.]—*Ann. Inst. Pasteur.* 1931. Nov. Vol. 47. No. 5. pp. 492–507. With 6 text figs.

The authors collected a number of ticks (*Rhipicephalus sanguineus*) from healthy dogs in the district of the Var, where no cases of fever had been reported and at a season of the year, spring, when fever does not occur. 60 of these ticks were ground up with sterile sand in saline solution: the mixture was centrifuged and the supernatant fluid injected into a patient with nervous disease. The patient's temperature was carefully recorded for over three months but continued normal throughout and the man showed no effects whatever following the inoculation. However it was found that his blood serum, which was tested before the inoculation with negative results and was also negative on the 4th day after the inoculation, gave a positive Weil-Felix reaction on the 14th day; 5 days later the reaction was positive in a titre of 1/250; six weeks after inoculation it was faintly positive in 1/50 but again rose to 1/250 3 months after inoculation. A monkey inoculated with blood from this man developed fever lasting about 10 days after 10 days' incubation; the serum showed a positive Weil-Felix reaction and an eruption consisting of purple spots developed on the eyelids of the monkey; obviously the blood of this man was infective for the monkey. Blood from the patient when inoculated into guineapigs produced a febrile reaction and this infection was passed on in series to several guineapigs, thus resembling the typhus virus in its infectivity for this animal.

One of the cutaneous lesions (purple spots) was removed from the eyelid of the monkey and sectioned ; it showed swelling and proliferation of the endothelial cells of the capillaries with perivascular infiltration, " cuffing," of these small blood vessels, a condition comparable to that found in the skin lesions in human cases. *D. H.*

BLANC (Georges) & CAMINOPETROS (J.). L'immunité dans la fièvre boutonneuse, la non virulence du sang des anciens malades et l'absence de pouvoir préventif de leur sérum. [**Immunity in Fièvre boutonneuse.**]—*C. R. Soc. Biol.* 1931. Dec. 4. Vol. 108. No. 35. pp. 853–854. [Pasteur Inst., Athens.]

Three volunteers, who had been inoculated in March 1931, one with emulsion of crushed infective ticks and two with virulent blood from cases of eruptive fever and who all had typical attacks of fever, were reinoculated in May, i.e. two months later ; all three proved to be immune whereas a fourth volunteer inoculated at the same time with the same dose developed a typical attack of eruptive fever (fièvre boutonneuse). This experiment was repeated ; 5 people recently recovered from the fever were reinoculated with the test dose; all proved immune ; a control contracted the disease. 40 cc. of blood taken from people recently recovered from fever was inoculated into a susceptible volunteer ; no infection resulted. Four volunteers were inoculated, two with 25 cc. of virulent blood and two with a mixture of virulent blood mixed with serum from two recovered cases ; all four developed typical attacks of fever ; apparently the serum of men recovered from the disease has no protective power. *D. H.*

BECKER (Frederick E.). Tick-borne Infections in Colorado. I. The Diagnosis and Management of Infections transmitted by the Wood Tick. II. A Survey of the Occurrence of Infections transmitted by the Wood Tick.—*Colorado Med.* 1930. Feb. & Mar. Vol. 27. Nos. 2 & 3. pp. 36–43 ; 87–95. With 4 figs. & 6 charts. [18 refs.] [Med. School, Univ. of Colorado, Denver.]

BONGIOVANNI (Vincenzo). Sulla febbre esantematica del Mediterraneo.—Reprinted from *Studium.* 1931. Vol. 21. No. 10. 12 pp. With 2 text figs. [41 refs.] [Inst. of Clin. Med., Univ., Catania.]

ERRATUM.

Vol. 29, No. 1, p. 19.

LINDBERG. Un cas de fièvre exanthématique observé dans l'Inde Britannique.—The English equivalent given was—Case of Typhus seen in British India.

As Dr. LINDBERG points out the translation should have been—Case of Eruptive Fever seen in British India.

UNDULANT FEVER.

TUNISIE MÉDICALE. 1931. Nov. Vol. 25. No. 9. pp. 459–550. With 14 charts & 3 figs. on 1 plate. [15 refs.]—Numéro consacré à la fièvre Méditerranéenne. [**Undulant Fever Number.**]

The Medical Society of Tunis recently discussed the differential diagnosis between undulant fever and tuberculosis and the discussion is summarized in this number of their journal. It is noted that the two diseases may develop simultaneously but it was generally agreed that undulant fever has no influence good or bad on the development of tubercular disease. Mention was also made of cases of undulant fever with definite pulmonary symptoms simulating phthisis but which cleared up entirely when the fever ceased; the cases which had most often given rise to errors in diagnosis were the early stages of tubercular disease (septicaemia) which ended in local tubercular lesions. It was, however, agreed that X-ray examination of the chest was of the greatest assistance in the differential diagnosis and that serological tests, blood cultures and Burnet's melitine tests should also be employed.

Articles follow dealing with undulant fever from the clinical, bacteriological and therapeutic aspects. Among those cases described are cases of meningitis, optic neuritis with sudden blindness, and spinal lesions occurring during the course of the disease. The case of myelitis was treated by intrathecal injection of melitine and made a good recovery as did the other cases when the fever ceased. One lengthy paper by NALLI of the Italian Hospital in Tunis deals with the treatment of undulant fever by means of "cutivaccination" (intradermal injections of small doses, 10 to 12 million, of killed cocci); the author claims that by this method a severe case of indeterminate length can be transformed into a mild case in which the fever will cease after a short period, 10 days or so. Two cases of undulant fever are described in which the first "waves" of fever, which lasted about three weeks, displayed all the symptoms of typhoid whereas the subsequent waves were frankly undulant fever, a diagnosis confirmed by the agglutination reaction. Two other articles follow dealing with the treatment of undulant fever by tripaflavine and by injections of melitine.

D. Harvey.

MARSEILLE-MÉDICAL. 1931. Dec. 5. Vol. 68. No. 34. pp. 693–754. [14 refs.]—Numéro consacré à la neuromélitococcie par le professeur Henri ROGER. [**Nerve Complications of Undulant Fever.**]

This number of *Marseille-Médical* consists of four articles by Professor Henri Roger, professor of the Neurological Clinic in Marseilles, dealing with the nervous complications in undulant fever. The first article describes the mental complications with illustrative cases, the second the meningeal complications and the third deals with cases of spasm of the cerebral blood vessels due to the action of the *Br. melitensis*. The fourth article describes some interesting cases in which meningeal symptoms developed 3 or 4 years after an attack of undulant fever. *D. H.*

JEWELL (N. P.). **Undulant Fever due to *Brucella abortus* in Kenya Colony.** With Report by W. B. C. BANKS.—*Jl. Trop. Med. & Hyg.* 1931. Aug. 15. Vol. 34. No. 16. pp. 261–263. With 3 charts.

This is a record of the first case bacteriologically proven of abortus infection in man in Kenya colony. The patient had in the course of his work attended to a cow, which had aborted, just three weeks before his fever started. The *Brucella abortus* was isolated from the blood, increased concentration of CO_2 being employed for the initial cultures; blackening of lead acetate cotton wool was noted. The serum of the patient agglutinated a strain of *Br. abortus* to a titre of 1/400. The serum of a cow infected with abortus agglutinated the strain isolated from the patient and a known strain to the same titre. In other particulars the strain isolated was typical. *D. H.*

MALARIA.

LEAGUE OF NATIONS. HEALTH ORGANISATION. **Conclusions of the Sub-Committee of Experts on Quinetum.** C.H./Malaria/167.—2 mimeographed pp. 1931. May 6. Geneva.

The Conclusions of the Sub-Committee of Experts of the Health Organization of the League of Nations are of general interest and are therefore published *in extenso*.

" 1. The name ' Quinetum ' should be reserved for a preparation consisting of quinine, cinchonidine and cinchonine in equal parts, that being approximately the normal proportion of these alkaloids in *Cinchoma succirubra*.

" 2. A new standard preparation ' total alkaloids of cinchona ' which we propose to name ' Totaquina ' should be recommended for the treatment of malarial populations. This preparation should contain at least 70 per cent. of crystalline alkaloids, of which not less than 15 per cent. must be quinine. Amorphous alkaloids should not exceed 20 per cent, mineral matter not more than 5 per cent. and water not more than 5 per cent.

" 3. The Sub-Committee of Experts propose that the Malaria Commission of the League of Nations should bring the new standard preparation (Totaquina) to the notice of the interested Governments with a view to the adoption of the formula in the National Pharmacopœias. The Commissions of the National Pharmacopoeias would prescribe the tests necessary for analytical control of the product.

" 4. In countries where cinchona febrifuge is at present manufactured or used, the competent authority should bring, by addition of crystalline or crystallisable alkaloids, the product as now manufactured to the Totaquina standard.

" 5. In the malarial tropical countries where the cost of imported drugs may prohibit their use, Governments should examine the expediency of cultivating Cinchona species for local use as total alkaloids of Cinchona ' Totaquina ' or for chemical or galenical preparations of the bark. Before undertaking such cultivation, however, careful preliminary enquiries into local conditions should be made with the assistance of medical, botanical, chemical and agricultural experts.

" 6. According to the information forwarded by Prof. Zünz and from the experience of those who have lived in Africa, it is well known that natives accept and even seek vegetable drugs found on their own soil in preference to imported remedies. In view of this attitude it would be desirable to place at the disposal of African Colonies the results of the experiments in Cinchona cultivation made in British East Africa and in the Belgian Congo and to communicate to the Governments the knowledge acquired both as to the species to be selected and as to the agricultural conditions required."

SPRUE.

BEIJNEN (G. J. W. Koolemans). Autochthone tropische spruw in Nederland. [**Autochthonous Tropical Sprue in Holland.**]—*Nederl. Tijdschr. v. Geneesk.* 1931. Dec. 12. 75th Year. No. 50. pp. 5978–5985.

In this clinical lecture two cases of typical sprue were presented and discussed. Neither of the women had ever been in the tropics. The chief symptoms were the characteristic tongue or glossitis, meteorism, intermittent painless diarrhoea, steatorrhea, light grey stools containing fat-soaps and fatty acids, emaciation. In one of these cases anaemia was slight and achlorhydria absent; in the other anemia was more severe and achlorhydria definite. The diagnosis lay between an affection of the pancreas, pernicious anaemia and tropical sprue. No local symptoms pointed to pancreas, while the mouth and gastric symptoms were also not in favour of a pancreatic causation. Emaciation is not a symptom of pernicious anaemia, but is very regular in sprue. On the other hand achlorhydria is practically invariable in pernicious anaemia and may or may not be present in sprue. The blood picture though very similar in both diseases is less marked in sprue. Most of the interest of these cases centres in their occurrence in a temperate climate. Other cases have been reported and the author considers that they may be commoner than has been suspected; he also inclines to the view that the "coeliac disease" of children is to be identified with sprue. *W. F. Harvey.*

i. SUÁREZ (Jenaro). **Pernicious Anemia and Sprue.**—*Porto Rico Jl. of Public Health & Trop. Med.* 1931. Dec. Vol. 7. No. 2. pp. 145–165. [16 refs.]

ii. ASHFORD (Bailey K.) & PONS (Juan A.). **A Clinical Investigation of Thirteen Cases of Anemia of Pernicious Type in Porto Rico.**—*Ibid.* pp. 167–201. With 7 charts. [29 refs.]

i. Fifty cases of early sprue and twenty advanced cachectic cases during the past 6 years have been selected and compared as regards the blood status with CABOT's series of 1200. The author concludes that at present the evidence is not sufficient for a definite decision as regards the identity of pernicious anaemia and sprue but he obviously believes in this identity, as may be inferred from the following quotation: "This finding [of Monilia psilosis in both] is in favour of a common identity [sic] of the two conditions. In pernicious anemia the achylia gastrica and the cord symptoms occur early. . . . In sprue the achylia gastrica and the cord changes occur late in the course of the disease. Should these differences be considered so important as to justify the belief that the two diseases are different entities?"

ii. The authors record details of 13 cases of anaemia of pernicious type, 12 of them in the cachectic stage of sprue. In addition to the blood changes, charts illustrative of them, figures from analyses of the gastric and, in some cases, duodenal contents are also given, together with clinical details and the findings on physical examination. The authors refer to the previous paper but have arrived at a different conclusion saying: "The fact of the matter is, we have reached the point where we must see that sprue and Addison's disease are two separate diseases

with a common haematologic phenomenon, a macrocytic anemia." Those interested must consult the original, since comparison of the details shows too great variations between the individual cases to permit of a summary. *H. H. S.*

FAIRLEY (N. Hamilton) & KILNER (T. Pomfret). **Gastro-Jejuno-Colic Fistula, with Megalocytic Anaemia simulating Sprue.**—*Lancet.* 1931. Dec. 19. pp. 1335–1341. With 5 text figs. [11 refs.]

Three cases of gastro-jejuno-colic fistula are recorded, two with a wealth of detail, the third less fully owing to the patient being too ill for tests to be carried out which were possible in the others. No abstract can do full justice to an article so important as this; workers in countries abroad where sprue occurs should study it well and note the points of similarity to and of difference from the real sprue, and practitioners prone to record cases of wasting and diarrhoea with copious pale stools as non-tropical sprue will gain much from a perusal of the article. It is doubly fortunate, therefore, that it has appeared in the *Lancet* and not in a journal appealing merely or mostly to tropical workers.

All three patients had visited tropical countries; the first had lived for 20 years in Malaya, the second for about the same period in Rangoon, the third worked for a steamship company whose vessels went to South America and Ceylon. All presented anaemia of the megalocytic type, with average erythrocyte diameter of 7·8, 8·4 and 8·4–8·6, low colour index, 0·8 in one, 0·6 in the second [erroneously given as 7·0] and 0·9 in the third. The two submitted to detailed examinations had stools with high fat content and adequate fat-splitting; the blood in each case had a reduced calcium figure with low serum-bilirubin, and both responded temporarily to liver extract and treatment for sprue. Points which might in a straightforward case have raised doubts as to the correctness of the diagnosis, but which might be overlooked among the number of positive signs or be regarded as mere anomalies, are the high HCl secretion, the leucocytosis (20,000 per cmm. with 82 per cent. neutrophiles in one patient), the ratio of neutral fats to fatty acids not being so disturbed as is usual in severe sprue (1 : 3 and later 1·7 : 1 in the first, and 1 : 2·6 in the second patient) and absence of stomatitis and glossitis in two of the three. The diagnosis was determined in the first by the onset of faecal vomiting, in the second by the discovery of a tumour which at operation proved to be malignant; the third was too ill for operative measures to be undertaken. The authors sound a most helpful note of warning in their conclusion that "any intractable diarrhoea supervening after gastro-jejunostomy should be regarded as originating from a gastro-jejuno-colic fistula until such a diagnosis is disproved," the malabsorption which results giving rise to symptoms closely resembling those of sprue. *H. H. S.*

MILNE (James). **The First Case of Sprue in Malta.** [Memoranda.]—*Brit. Med. Jl.* 1932. Mar. 12. pp. 471–472.

The patient was an army officer, aged 52 years, a Maltese who had lived all his life in Malta except during four years' war service in the near East. He had suffered from enteric fever 25 years before and from amoebic dysentery in the war, both of which infections are well known precursors of sprue, the symptoms were typical and the blood conditions, chemical and

general, were confirmatory. Improvement followed the administration of dilute HCl, calcium lactate, and Fairley's sprue diet of high protein, low fat and carbohydrate.

The chief interest of the case rests in the fact of its being the first recorded from Malta, though in view of the long interval which may elapse before symptoms declare themselves and of the fact that the patient had been for 4 years out of Malta, contraction of the disease actually in Malta is not proved beyond all doubt, even if the probability is great. *H. H. S.*

SEDAT (H.). Ein Fall von einheimischer Sprue. [**Indigenous [Non-Tropical] Sprue.**]—*Schweiz. Med. Woch.* 1932. Mar. 12. No. 11. p. 260.

This is recorded on the grounds that it is the first indigenous case known in Turkey (Stamboul). The patient was a man of 39 years with many of the characteristic symptoms of sprue, starting with sore tongue and diarrhoea in March 1928. Ten months later he had lost 38 lbs. in weight and he was seriously anaemic—red cells 1,880,000 per cmm., Hb. 47 per cent., colour index 1·3. Whether the anaemia was of the megalocytic type is not mentioned nor the results of faecal analysis. He improved rapidly on a diet containing liver and fruit, with little fat; he was also given calcium, pepsin and pancreatin.

He had never lived in the tropics but during the war was in Mossel [? Mossel Bay, Cape Colony] and Persia (8 months in Hamadan) and later was for 2½ years in Mossel. He did not suffer from diarrhoea in either of these places. He had had an attack of typhoid fever in 1918, and suffered from malaria prior to that, but there was no history of dysentery.

H. H. S.

MONGE (Carlos). El primer caso de sprue señalado en al Perú. [**First Case of Sprue reported in Peru.**]—*Crónica Méd.* Lima. 1931. Aug. Vol. 48. No. 818. pp. 245–250. [19 refs.]

——. Premier cas de sprue signalé au Pérou.—*Rev. Sud.-Américaine de Méd. et de Chirurg.* Paris. 1931. Dec. Vol. 2. No. 12. pp. 1197–1203. [20 refs.]

The case here recorded is not altogether convincing. The patient was a Spaniard, 57 years old. Some of the symptoms of sprue were present—copious pasty stools, meteorism, burning sensation in the tongue, and loss of weight—but in the earlier stages the stools were fluid, bilious, occurred after dinner, contained at times mucus and blood [but there was no history of dysentery and anti-dysenteric treatment was of no avail]. The blood picture is said to have been "of the pernicious type," but details are not given to support this; HCl was completely absent from the gastric contents. Chemical tests with the blood and faeces are not mentioned. Cure was effected by "liver and a diet rich in vitamins." *H. H. S.*

CANAL-FEIJÓO (E. J.). Posibilidad de la existencia del sprue en la provincia de Santiago del Estero. [**On the Existence of Sprue in Santiago del Estero.**]—*6a Reunión Soc. Argentina Patol. Regional del Norte, Salta, 29 y 30 septiembre y 1 octubre, 1930.* pp. 100–105. [18 refs.]

The author states that sprue has not hitherto been recorded in the Argentine Province of Santiago del Estero, but that he has seen more than a dozen cases in 18 months, and he relates the following as a typical instance :—

A woman of 20 years, after a confinement, suffered from diarrhoea for 15 days, together with generalized abdominal pain. The stools, 6–7 in 24 hours, were liquid, yellow, copious and frothy. After 4 or 5 days of this small ulcers appeared on tongue, cheeks, and pharynx, with salivation. A month after parturition she had a rosy, pruriginous, urticarial rash. For 5 months the diarrhoea and stomatitis recurred at intervals. The liver could be felt below the costal margin. In one of these attacks the stools were scanty, with blood and mucus, and much tenesmus. Examinations revealed *G. intestinalis* (adults and cysts), *Chilomastix mesnili*, Blastocystis and eggs of *Hymenolepis nana*. Blood showed anaemia, red cells 2,240,000, white 7,600 per cmm., normoblasts present and a relative lymphocytosis (33·5 per cent.); other blood examinations such as Ca. and P. estimations are not mentioned and do not seem to have been carried out. Marked improvement followed a diet chiefly farinaceous with bananas and liver. In all the cases observed by the author, there have been flagellates and in some the ova of *H. nana*.

[The geographical distribution of sprue is so peculiar and apparently arbitrary that records of its occurring in fresh localities are always of interest. It is well, however, not to regard all cases of diarrhoea with frothy stools as sprue, and the above presents many anomalies. The liver not reduced in size, if anything enlarged, the mucosanguineous stools accompanied by pain and tenesmus, the presence in practically all cases of flagellates and helminth ova, the urticarial rash, the rapid amelioration on starchy food, are some of the points which make one pause before definitely deciding that these are all cases of sprue.]

H. H. S.

Rogers (Leonard) & Cooke (W. E.). **Resistant Sprue Anaemia yielding to Intravenous Liver Extract.**—*Brit. Med. Jl.* 1932. Feb. 13. pp. 272–273. With 1 chart in text.

The patient, a European aged 47 years, contracted sprue in Burma in 1923. He reacted well to milk; relapses occurred in 1925 and 1926 when he improved on milk and streptococcal vaccine, in 1928, with severe anaemia—red cells 1,470,000, haemoglobin 50 per cent., colour index 1·7 [not 1 as stated in the paper]. Transfusion with citrated blood, Fowler's solution by mouth and a milk diet resulted in the blood returning to normal. In July 1929 a fourth relapse occurred clearing up on liver extract and high protein diet by January 1930 [not 1929]; the following July and again in 1931 further relapses occurred, and in the last red cells were below 2 million, Hb. 40 per cent., the anaemia of the megalocytic type. In spite of transfusion the condition became worse and in 5 weeks red cells were down to one million, Hb. 20 per cent.

Hepatex P.A.F. was then tried at the suggestion of Dr. Donald Hunter. 5 cc. of this is equivalent to 100 gm. fresh liver. 22 cc. were injected intravenously during 5 days, 2 cc. on the first, 5 on each of the succeeding four days. The last two doses caused acute abdominal discomfort with pain, vomiting and enlarged and tender liver, but the condition of the blood had improved (r.b.c. 1,800,000 per cmm.). During the succeeding 4 weeks 10 doses of 2–3 cc. each were given intramuscularly with excellent response; on October 22nd red cells were 5,060,000, Hb. 84 per cent. and the patient left hospital. At the end of the year the improvement had been maintained.

As the authors state, the main points of interest are: The rapid response to hepatex intravenously, the acute abdominal condition following the subsequent intravenous injections, and the subsidence of this when the intramuscular route was substituted. *H. H. S.*

WILLOUGHBY (Hugh). **The Treatment of Sprue.**—*Jl. Roy. Nav. Med. Serv.* 1931. Oct. Vol. 17. No. 4. pp. 272–277.

This article contains a brief but comprehensive account of the treatment of sprue patients together with the rationale on which it is based. The main fundamental conception being that sprue is primarily a disease of the digestive system, with anemia of either the toxic or the pernicious type as a secondary development, indications for treatment are considered under the heads of dietetic primarily, therapeutic or symptomatic secondarily. Standard dietaries are given : milk for the first week ; milk, sago and liver soup for the second, and a more varied convalescent diet to be maintained for 6 months at least. For those who tolerate milk badly or are markedly anaemic, accessory or substitute foods are mentioned, such as raw meat sandwich, soups, fruits, vegetables, etc. The question of drug treatment is dealt with under the headings of diarrhoea, flatulence, anaemia, achlorhydria, constipation, appropriate remedies on the usual lines being suggested for each. Blood transfusion in patients with marked anaemia has often proved of great value, citrated whole blood in small amounts of 10 to 20 cc. being given. The treatment of concomitant disease, e.g., syphilis and amoebiasis, is duly insisted upon, as a prelude to dealing with the sprue itself. A useful recipe is given for preparing liver soup and advice regarding exercise, general régime, return to the tropics and so forth also find a place. *H. H. S.*

FAIRLEY (N. Hamilton). **A Note on the Treatment of Sprue with Special Reference to a High Protein Milk Powder.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1932. Jan. 30. Vol. 25. No. 4. pp. 297–304.

" Evidence is steadily accumulating," states the author " that sprue is a disease of the gastro-intestine characterised by deficient gastric secretion . . . as well as by mal-absorption of fats, glucose and calcium in the small intestine." Vitamin deficiency and monilia infection are no longer to be regarded as primary aetiological factors. The dietetic line of treatment set out in this article aims at resting the alimentary tract. Dr. Fairley explains briefly the principles underlying his treatment by high protein, low fat, low carbohydrate diet. In place of high meat protein he has been trying dried high protein milk powder with a ratio of protein 1·0, fat 0·3, and carbohydrate 1·3 with excellent results. With either cows' or buffaloes' milk, widely used in the tropics, to obtain the necessary amount of protein the patient, in spite of his inability to absorb fats, would be taking more fat than even a healthy active man would require. Moreover, tropical milk is in general notoriously impure bacteriologically.

At the author's suggestion the firm of Cow and Gate, Ltd. have prepared a milk powder (Sprulac) which contains as percentages : Moisture 3·0, fat 10·6, protein 34·0, lactose 45·0, mineral matter 7·4 ; and has a caloric value per ounce of 125. The method of preparation is detailed ; the bacterial content is under 150 organisms per cc., whereas a certified T.T. milk contains from 3,000 to 30,000.

Five graded diets are given, from one of sprulac only with a caloric value of about 700 to one with additions giving a value of 2,516. Progress from one to the others may be rapid, the patient often taking No. 5 in 3–4 weeks, when a more liberal dietary can be substituted.

The average stay in hospital of the ten patients here considered was under 8 weeks (54·5 days); the gain in weight was 8 lbs. (weight is usually lost until diet 4 or 5 is reached) and the blood showed on an average an increase of 1,750,000 red cells, 20·2 per cent. haemoglobin and a reduction in the megalocytosis to normal diameter. The end results in all were very satisfactory although the early relief of symptoms was perhaps not so dramatic as with the high meat protein; when liver extract is given in adequate quantities the blood restoration is equally good with the milk as with meat and "sprulac should have a special field of usefulness in the tropics where good quality meat in a satisfactory condition is often unprocurable, and where milk, owing to its high fat and bacterial content, frequently proves an unsuitable diet for sprue cases." [Several misprints have escaped the proof reader.]

H. H. S.

THOMAS (W. S.) & BAUMGARTNER (E. A.). **Red Cell Diameters in Tropical Sprue Cases with Severe Anemia.**—*Clifton Med. Bull.* 1932. Jan. Vol. 18. No. 1. pp. 9–13.

PRICE-JONES has stated that a large coefficient of variation in size of red corpuscles is more constant though less characteristic in pernicious anaemia than a large mean diameter.

The authors have measured 500 cells in each of 17 cases of sprue with severe anaemia and have tabulated their results, giving the erythrocyte count at the beginning of treatment and on leaving hospital —a period varying from a week to 7½ months—the mean diameters, the extremes, the dispersion and the coefficient of variation. In 15 the mean diameter at entry was over 8μ and in 9 it was over this on discharge.

For comparison they took the average findings in 27 cases of pernicious anaemia, 12 detailed by PRICE-JONES and 15 by MEDEARIS and MINOT. The anaemia at entry was of about equal severity in all three series, but at discharge the pernicious anemia patients had improved much more than those with sprue. In the author's series (sprue) the mean diameter, 8·40μ, was higher than either of the others, but at discharge the pernicious anaemia showed about the normal average while the sprue had an average still definitely megalocytic. The coefficient of variation in the latter was over 8·3, which was the smallest figure in the PRICE-JONES series of pernicious anaemia.

One patient had been under observation two years before she became severely anaemic and from repeated examinations in the course of 6½ years it was found that "the cells are larger and the variation greater at the period when the most marked anaemia is shown than either before the anaemia occurred or after its improvement under treatment."

H. H. S.

REVIEWS AND NOTICES.

SANDERSON (G. Meredith) [M.R.C.S. (Eng.), L.R.C.P. (Lond.), D.P.H. (Cantab.), etc.] **Elements of Tropical Hygiene. A Text-Book of Hygiene for African School-Teachers.**—118 pp. With 32 text figs. 1932. London: Longman, Green & Co. [2/-.]

The author states that his aim in writing this book is to "convey a general idea of the principles of Hygiene and to suggest how they may be applied to the villages of tropical Africa." Believing that this knowledge can best be spread by the personal influence exerted by teachers he has therefore written this text-book specially for their use.

The book is divided into three parts: Part 1 deals with Life and The Body, Part 2 with Some Common Diseases, and Part 3 with Sanitation: this includes chapters on Food, Water, Housing and Personal Hygiene.

The author expresses himself clearly and simply and the advice given is practical and adapted to life in primitive rural communities. A few of the statements perhaps require a certain amount of qualification, as for example—"Except in cold climates the naked body is the healthiest . . . and it is a fact that races that wear least clothing are the most moral." And again, "Machine ground flour contains both husk and germ and is therefore a better food than that prepared by pounding and sifting."

There are very few printer's errors, but on page 15 the germ of sleeping sickness, which is described as like a tiny snake, is illustrated in the diagram as a spirochaete. Most of the illustrations, however, are excellent and the diagrams drawn by Mrs. ANDERSON illustrating African village life are particularly good and should help very much in making the reader see that the subject-matter is really applicable to his daily life.

There is undoubtedly a need for a book on hygiene for the school teacher but opinions will vary as to the necessary content of such a book. A teacher should certainly be familiar with the elements of hygiene and, if he or she has not already learnt these while at school, it will be necessary to supply this knowledge in the teachers' training-schools or in subsequent vacation-courses. One would expect, however, that in a hygiene text-book written specially for teachers definite advice would be given as to how the teacher can best pass on his knowledge to his pupils and how he can most easily find practical demonstration to exemplify the facts. Again, one would expect to find in such a text-book a certain amount of definite instruction as to how the teacher may assist in preventing his pupils from acquiring defects or diseases while actually at school, e.g. owing to defective school buildings, furniture, latrines, lighting, ventilation, etc.; or owing to the spread of epidemics of scabies, ringworm, jiggers, trachoma, yaws and other infectious conditions.

These aspects of the subject are scarcely, if at all, dealt with in this text-book and in the reviewer's opinion it thereby loses somewhat in value as a guide for teachers. *M. G. Blacklock.*

SWELLENGREBEL (N. H.) [Professor d. Zoologie a. d. Universität Amsterdam, etc.] & RODENWALDT (Ernst) [Inspekteur d. Volksgesundheitsdienstes f. Ostjava]. **Die Anophelen von Niederländisch-Ostindien.** [The Anopheles of the Dutch East Indies.] 3rd Edition.—pp. viii+242. With 44 figs. & 24 maps in text & 24 plates. 1932. Jena: Verlag von Gustav Fischer.

This is the 3rd edition of Prof. Swellengrebel's work, the 2nd (Dutch) edition of which was reviewed in this *Bulletin* (Vol. 19, p. 110) ten years ago. It is larger by 87 pages, but is distinguished by the same judicious proportion and the same clearness and conciseness that characterized the former issue. The first 52 pages are given to matters of general import—

the structure of the imago and larva ; classification, synoptic tables for the specific identification of males and females and larvae, and a critical consideration of the value of the term " species " in the genus *Anopheles* ; a general survey of the geographical distribution of the species in the Netherland East Indies ; the jeopardy from malaria ; and instructive remarks on capture and collection, manipulation, making and mounting of specimens and preparations, and on the management and breeding of the living insects. The rest of the text contains the diagnoses and descriptions of the subgenera and the species (females, males and larvae) known to exist in the Netherland East Indies. In their classification of them the authors have achieved a rigorous precision which we need not criticize, since formal systems are so much a matter of opinion. They not only follow the trinomial fashion, but they also recognise " groups " under the subgenus, and binomial " superspecies " under the " groups," and trinomial species and their varieties under the " superspecies." For instance, in the subgenus Anopheles *sensu strictiori* there is placed under a separate Myzorhynchus " group " a " superspecies " *Anopheles hyrcanus*, and under this again a species *A. hyrcanus typicus* having three separate varieties. This seems to be giving rather too much play to the high priests and lawyers of taxonomy. Apart from the taxonomic scheme the systematic descriptive treatment of species, of which there are 35 (or 36) besides 19 varieties, included in 9 subgenera, is a model of exposition and instructive illustration. Following the diagnosis of the subgenus there comes in each case a statement of the differential characters of the superspecies, subspecies, and varieties included in it, and then a concise account of each of these, which includes a critical description of both sexes and larva ; the biology and the pathogenic significance ; and the geographical distribution of the species in the Netherland East Indies—this being stated in very particular detail and instructively illustrated in an elegant little map for each species. In the case of certain species some attention is given to questions of control. Besides the abundant and well-chosen text-figures and maps there are 24 very neat plates (each of which in the majority of cases is devoted to one species) exposing the more important distinctive features of the species and varieties. The explanations of the plates are eminently sufficient and there is a good index and an ample bibliography. *A. Alcock.*

HANDBUCH DER HAUT- UND GESCHLECHTSKRANKHEITEN. 1932. Vol. 12. Part I. pp. xi+857. With 503 figs. **Tropische Dermatosen : Juxtaartikuläre Knoten : Rattenbisskrankheit.** [Tropical Dermatology.] Bearbeitet von F. BREINL, F. FÜLLEBORN, H. HOFFMANN, E. MARTINI, M. MAYER, E. G. NAUCK, H. DA ROCHA LIMA, B. SKLAREK, H. ZIEMANN. 1932. Berlin : Verlag von Julius Springer. [Bound Rm. 168 ; Unbound Rm. 166.]

This book, which is the first part of the twelfth volume of the great treatise on skin and venereal diseases which is being published under the auspices of the German Dermatological Society, deals in an exhaustive manner with skin conditions peculiar to the tropics. It includes not only diseases which are strictly cutaneous but also the dermatological manifestations of systemic diseases and the skin lesions produced by insects, helminths and other noxious creatures as a result of contact, biting or penetration. The title of the book gives but a vague idea of its contents, which embrace yaws, juxta-articular nodules, goundou, ulcus tropicum, leishmaniasis, the eruptions associated with sleeping sickness, plague, virus diseases and many other generalized infections, mycoses and blastomycoses, rat-bite fever, to mention only a few. There is a section dealing with ubiquitous skin diseases of coloured races wherein are discussed the peculiarities of the skin of these peoples, its structure, physiology and pathology and the bearing these have on certain diseases which may be regarded as due more or less directly to deviations from the normal.

Another section describes the skin lesions produced by insect poisons which are either injected or merely applied to the skin, the results of invasion of the skin by insects and the toxic effects of other animals. A final section is devoted to a consideration of the lesions associated with helminthic infections. It would appear from a perusal of the book that every skin condition peculiar to the tropics has been passed under review, for the above summary is but the barest outline of the mass of material it contains. The descriptions, so far as it has been possible to read them, appear to be clear, accurate and up to date, while subjects of dispute are discussed with sound critical judgment. This was only to be expected, for the various articles have been written by persons of acknowledged repute and authority. Though built on such an ambitious scale the book retains the highest standard throughout. The subject matter is well arranged, the printing and paper are good, while the 503 illustrations, some of which are coloured, are excellent. The reviewer knows of no book on tropical dermatology which can compare with it. With its very complete bibliographies and its detailed index of subjects and authors there can be no doubt that it will take its place in the front rank of standard works in the field of tropical medicine. *C. M. Wenyon.*

VETERINARY BULLETIN. 1932. Feb. & Mar. Vol. 2. Nos. 2 & 3. pp. 65–130; 131–194.—Published by the Imperial Bureau of Animal Health, Weybridge, Surrey, England. [Price 5s. net. Annual subscription £2.]

The *Veterinary Bulletin*, now in its second volume, has become a monthly journal. There are two other changes for the better: though the format is unaltered the line of type is an inch shorter so that the Bulletin can be read without eye-strain; and the summaries are signed. In the numbers under review the matter is arranged under twelve headings with full Contents and an Authors' Index. It is clear that no progressive veterinarian can be without the *Veterinary Bulletin* and that it will be widely consulted by those whose main interest is human medicine, especially parasitology in the larger sense. It is published by the Imperial Bureau of Animal Health, Veterinary Laboratory, Ministry of Agriculture and Fisheries, Weybridge, Surrey, at £2 per annum. *A. G. B.*